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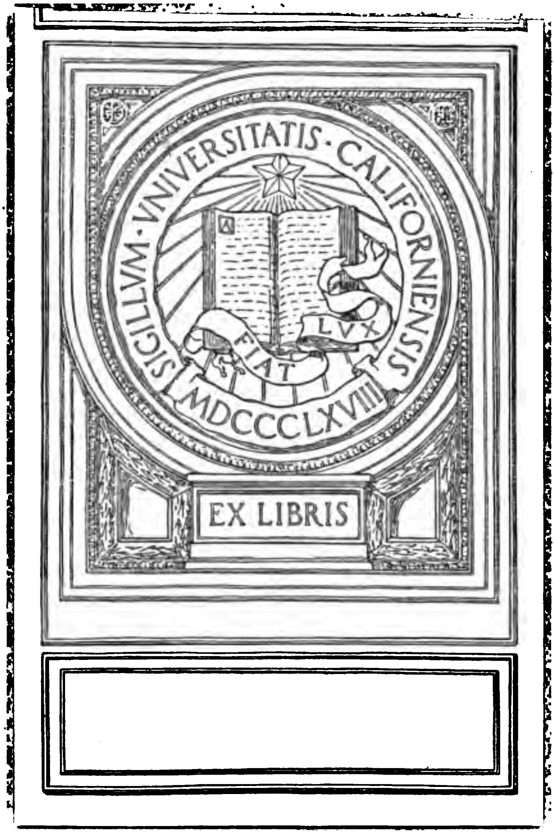
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THE

DEPRECIATION OF FACTORIES

AND

THEIR VALUATION.

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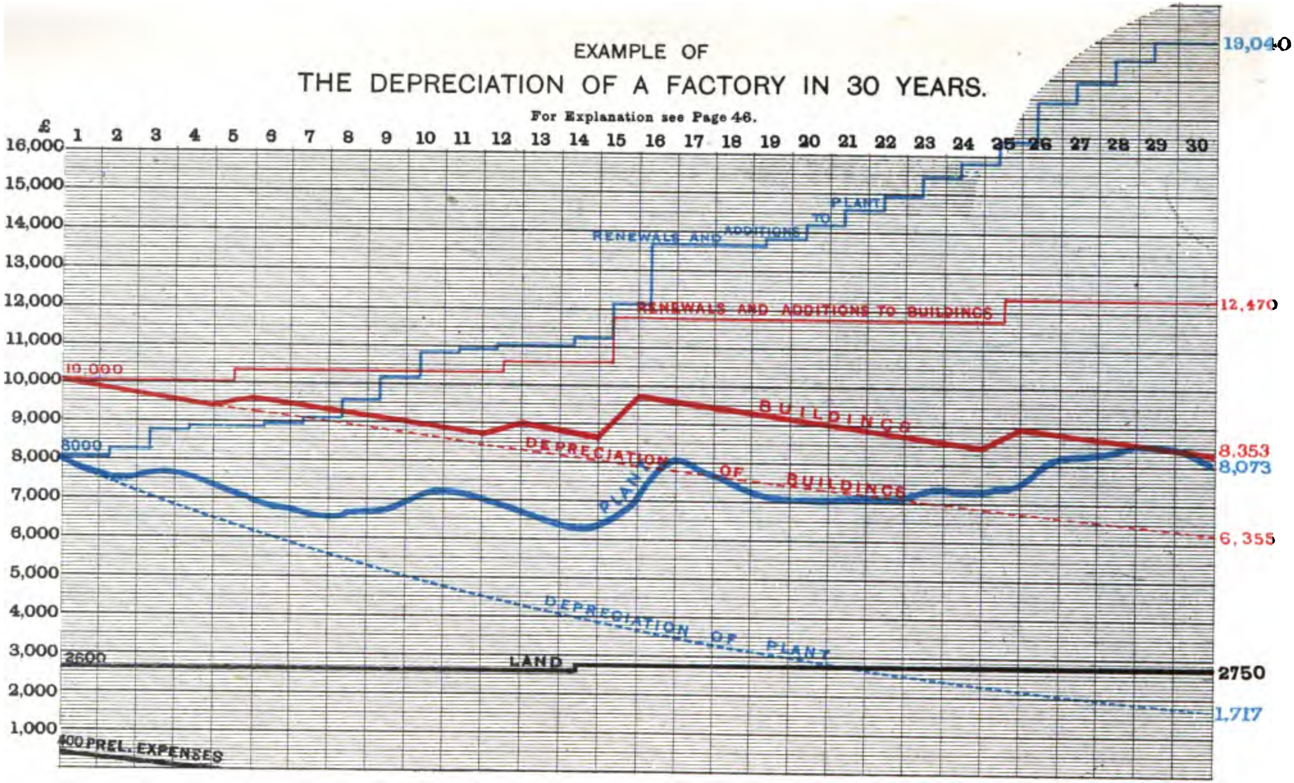
EXAMPLE OF

THE DEPRECIATION OF A FACTORY IN 30 YEARS.

For Explanation see Page 46.



	Value in 1st Year.		30th Year.
Buildings …………	10,000	………	8,353
Plant…………………	8,000	………	8,073
Land …………………	2,600	………	2,750
Prel. Expenses …	400	………	
Total	21,000	………	19,176

THE

DEPRECIATION

OF

FACTORIES

AND

THEIR VALUATION.

BY

EWING MATHESON,
M. INST. C.E.

LONDON:
E. & F. N. SPON, 16, CHARING CROSS.
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PREFACE.

In the Financial administration of a Factory, the Accounts which relate to Disbursements and Receipts are so obviously necessary to the continuous working of the undertaking as to be rarely neglected, and if errors or omissions occur, they quickly compel attention. But the Capital accounts are not always deemed to be of such pressing importance, and variations in the value of plant arising from the wear and tear may be left unnoted. The increasing extent of Factories, the subdivision of capital by means of joint-stock companies, and the conflicting interests that arise in regard to preference shares and borrowed capital, enhance greatly the importance of correct systems of account. Qualified book-keepers should be employed to arrange and check factory accounts, and the profession of Accountant and Auditor is rising in importance accordingly. But while Accountants may properly deal with facts and figures presented to them, and may fairly allot to Capital and Revenue actual expenditure or Estimated Depreciation, they must always be dependant for the accuracy of these *data* on those technically acquainted with the operations of manufacture. It is endeavoured in the present short treatise to point out the leading circumstances that must be considered in "Writing off" for Depreciation, and to tabulate in a simple manner the annual changes that occur in Capital value.

In the Valuation of a Factory for any purpose whatever, the past "depreciations" and additions have to be considered, and the possible modifications which may be necessary are dealt with in the later chapters.

The first four chapters have already appeared in the *Engineer*, from September to November, 1883, but have been revised and extended here.

LONDON,
October, 1884.

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PART I.

DEPRECIATION.

CHAPTER I.

THE GENERAL PRACTICE OF DEPRECIATION.

THE Deterioration of a Factory by time and use, the appraisement of the loss and its allotment in the accounts of the undertaking, are matters of great importance in the economy of management; and any neglect or error in "writing off" will, according to its extent, render calculations of cost and profit fallacious. No fixed rules, or rates of depreciation can be established for general use, because not only do trades and processes of manufacture differ, but numerous secondary circumstances have to be considered in determining the proper course. It may, however, be possible to lay down some general principles which will always apply, or which, at any rate, may with advantage be held in view in deciding particular cases.

Fixed rules cannot be established.

The question of depreciation cannot be separated from that of maintenance, and in theory one may be said to balance the other. In practice it is only in certain cases that this can be acted on. In any particular building, machine, or appurtenance, decay or wear of some sort must take place in the course of time, and repairs in order to compensate fully for the decline in value, must take the form of renewal. This being the case, the absolute

Depreciation and maintenance.

replacement of some portion of the plant every year may thus maintain an average aggregate value. In only two kinds or classes of plant, however, can such an exact balancing of loss by repairs and renewals be ventured on; one, where the plant wears out so quickly as to need replacement at short intervals, affording constant proof, by the mere continuance of working, that not only the earning power of the factory is maintained, but also the capital value; and in a second class, that of undertakings so large and permanent as to afford a wide average of deterioration and renewal over the whole plant.

Renewals may balance loss.

See page 43.

For instance, on a Railway the deterioration of the fixed and moving plant is supposed to be fully and properly met by the expenditure for repairs and renewals, and so long as the working of the railway is maintained, no regard is had to a future valuation such as might disturb the accounts of a manufactory subject to a change of ownership or cessation of trade. When a railway has been in operation for many years, and an average rate of expenditure in relation to revenue has been arrived at, such a method may be sound, but there is a risk that in the earlier years of working the gross revenue may not be sufficiently charged with due depreciation.

Railway renewals.

Average rates.

Railway companies in England have to publish annual accounts in a form prescribed by law, but these accounts seldom fully disclose the deterioration of the plant, partly because the expenditure of a particular year for repairs or renewals may not represent the deterioration due to the traffic of that year, and partly because expenditure necessary for maintenance may be mixed up with the capital expenditure for extensions.

Railway accounts.

Maintenance charged to capital.

There is often a natural tendency to write off for depreciation in proportion to the profits, rather than to the deterioration; and yet a large portion of the plant of a railway affords by its uniformity facilities for analysis which are wanting in most private manufactories. The Permanent way, for instance, by its extent, generally allows of trustworthy averages; the Locomotives also being composed of essential parts of a uniform kind, the annual expense due to wear and tear is ascertainable without much difficulty after a few years of working, and can be so tabulated * and compared with the traffic of a particular period as to allow the establishment of fixed rules as to the cost in wear and tear due to such special causes as *e.g.* altered kinds of traffic, increased mileage, and alterations in speed.

Analysis of expenditure.

But while such conspicuous and essential expenditure as that for the maintenance of permanent way and rolling-stock cannot be ignored, the Workshops of a railway, in which much of the expenditure takes place, form an adjunct of an indefinite character, where no such precise proportion of annual expenditure to traffic is established. Railways differ in regard to their workshops, some companies making engines as well as repairing them, and it is not always easy to separate and allot the expenditure and establishment charges due to new work and to repairs. Some railway companies, however, go much farther than others in the analysis of their workshop accounts.

Railway workshops

Cost of making and repairing not easily separated.

Indirectly the varying value of railway workshops is manifested from time to time by the assessments for purposes of Rating, which are made upon railways in common with all other real property. From this point of view a low valuation is in the interest of the company, and deterioration by time and wear has periodically to be considered to ascertain how far it balances additions and renewals.

Rating valuation. *See page* 91.

The omission of any provision in the earlier years for future renewals is often excused by the small earnings, but the wear and tear necessary to such earnings must

Provision for renewals.

---

* See "The Maintenance and Renewal of Railway Rolling Stock," by R. Price Williams, M. Inst. C.E. 'Minutes of Proceedings of the Institution of Civil Engineers,' vol. xxx., Session 1869–70.

sooner or later be paid for out of revenue or from new capital; and though in course of years the expenditure for repairs and renewals must almost of necessity balance the deterioration if the traffic is to go on, there is room for much error in the accounts of particular years; and in the case of constantly changing shareholders, of an unfair allotment of charges.

Unfair to changing owners.

Surplus receipts treated as profit without regard to provision for depreciation.

The temptation to treat as Profit the Surplus of Receipts over Expenditure, without sufficient allowance for Deterioration, appears to be often irresistible. Thus, in the case of a Tramway undertaking in its first years of working, a dividend may be possible only by writing off little or nothing from the capital value of the cars, the harness, and the horses. This, of course, cannot last without the introduction of new capital, but in undertakings long established there yet may be epochs of fictitious profits due to various causes. For instance there may be neglect of repairs, which, when the necessity for them becomes evident, will involve a heavy outlay for renewals; or it may arise from actual fraud in postponing expenditure, so as to show large profits, which will raise the value of shares for stock-jobbing purposes. There are railways where the dividend income and the corresponding value of the shares have fluctuated considerably, not according to alterations in the real earnings, but according to alternate neglect and attention in regard to plant.

Fictitious profits.

Water companies' accounts.

Provision for renewals.

Water-supply companies afford another example of permanent undertakings where deterioration of plant is not always dealt with in the accounts. It is not usual to write off in the annual accounts, as presented to the shareholders, anything for depreciation, but renewals as well as repairs are effected out of the current revenue. In very large and long-established undertakings an average expenditure will eventually be arrived at, which, as in the case of railways, serves instead of a depreciation rate by charging the earnings of each year. But in the earlier years of working, when expenditure for renewals has not commenced, the earnings are often divided as profit, without setting apart a reserve for the replacement of the plant.

Renewals neglected in earlier years.

In the case of water companies with a capital not exceeding £100,000, the expenditure for renewals occurs at irregular intervals; but instead of providing by anticipation for such outlays, it is more usual to open a "Suspense account," after the expenditure has been incurred—as, for instance, for a new pumping engine or boilers—and to divide the cost over a subsequent term of years. Of course, when this system has become well established, and suspense accounts are always running, the effect on any particular year's income will probably not differ much from that of a regular depreciation rate, but the apparent profit of the earlier years has been increased at the expense of later years. A suspense account may be best opened before the actual expenditure occurs; it would then be usually called a Reserve fund.

Suspense accounts.

Reserve fund. *See page* 50.

In many companies, however, even where no direct provision for repairs and renewals is made, there is an indirect reserve. Water-supply companies are in this country almost always established by Act of Parliament, and the mode of keeping accounts and dividing profits is to some extent prescribed. Subject to occasional modification in the special Acts authorising particular companies, the conditions generally are those of the Waterworks Companies' Clauses Consolidation Acts of 1845 and 1877, which allow, in the discretion of the directors, a reserve fund to be set apart out of profits to equalise dividends in any future years, when current profits do not allow the maximum dividend permitted by the special Act of the company, the reserve fund being limited to one-tenth of the capital. This reserve fund can only be applied to its prescribed purpose of equalising dividends and cannot be

Indirect reserve fund.

Dividends equalised.

Limitation of reserve fund.

used directly for repairs; but it is obvious that if the earnings of a particular year are burdened with some heavy expenditure for renewals, the latter are really paid for out of the fund nominally applicable for dividend. But the establishment of such reserve funds is seldom authorised by shareholders, except out of surplus earnings beyond 5 or 6 per cent., and therefore in the case of struggling or unremunerative companies the renewals are all charged forward. The unsoundness of the system may be disguised; but it is one, which, when adopted in private undertakings, is frequently a cause of illusion and failure. In the case of prosperous companies with large net revenue, and whose monopoly assures a continuance of profits, repairs and renewals are carried out liberally; and in cases where the rate of dividend is limited by law, there is even a tendency to overstate the expenditure on this account, so as to disguise the real net profit, and postpone a reduction in the price of water which profits beyond a certain limit might render obligatory.

Renewals charged forward.

Excessive profits disguised.

Gas companies' accounts.

With Gas-supply companies also, a reserve fund for renewals is not always established, and though in one sense they are permanent undertakings, they have not so secure a future as in the case of water companies. Moreover the plant used in the manufacture and distribution of gas differs from that used in water supply—more of it being of a kind to wear out rapidly. Retorts and other parts of the plant of short endurance are renewed out of current revenue, and with due care these charges bear a fixed proportion to the earnings; but when some considerable renewal takes place, and only the part which extends the earning capacity is defrayed out of new capital, the remainder of the outlay, which only makes good the wear and tear of the past, tells most unfairly on the current year's income. A postponement of the charge to future years is equally unsatisfactory, if the deterioration which has called

Deterioration of plant.

Renewals unduly allotted.

for it is really due to the work of preceding years. But, as in the case of water companies, if the profits are large and the dividends are restricted to a maximum, the expenditure out of revenue for repairs and renewals, and even for what really are extensions, is sometimes very lavish, and the accounts may be as fictitious in this direction as in the reverse cases above alluded to. Legislation, however, has been directed towards the ensuring of a fairer system, increased dividends being permitted only in proportion as the price of gas is reduced. The interests of the consumers and the shareholders are thus rendered more nearly identical, so far as economy in management is concerned.

Lavish renewals out of profits.

Profits limited by law.

In the case of very large Manufactories, where there is a considerable annual outlay for renewals of plant as well as for repairs, such expenditure, if charged to revenue, may fairly balance the average deterioration of the whole. But to secure this, there should be an ample margin—say by an obvious increase of the plant every year—for without this there will be a risk that a gradual lessening of the total value of buildings or plant will take place, ultimately involving considerable expenditure to restore its earning capacity. There may be neglect of due provision for deterioration in a new factory without any warning sign, while everything is in full working order. It is true as in the case of the railway just cited, the earnings may be undeveloped, and no fund available from which to provide for future repairs, but the omission is none the less unsound.

Renewals may balance deterioration.

See page 12.

Risk of neglect in new factories.

It is seldom that any large manufactory can be successful without Extensions of plant, but an increase in capital value cannot be properly assumed unless the earning power is increased in a corresponding ratio and the shortened life of the plant due to past use duly provided for. In the accounts of a factory it is difficult even for those engaged in its management always to distinguish between

Tendency of factories to increase.

the expenditure for renewals chargeable to capital and that due to deterioration; and to those outside the management it is quite impossible without careful investigation, rarely attempted. Of course, actual additions to the size of a factory may be duly reckoned as increasing the fixed capital; but such an increase may be wholly or partially neutralised by the deterioration of the older part. It may be said that the success of many undertakings, and their survival through the vicissitudes of dull times and during radical alterations in trade, have been due to the liberal charging of extensions to revenue.

Difficulty in allotting charges.

See Frontispiece.

Deductions for renewal

But while manufacturers may deduct from the value of their plant the estimated loss by wear and tear, and must in prudence apply part of their earnings to make good the loss in the capital account, the Law only partially recognises such a deduction from profits in calculating Income tax. Up to the year 1878 no allowance whatever was permitted, and in the year 1876 the principle of this refusal was confirmed by the following test case tried before three Judges in the Exchequer Division of the High Court of Justice:—

not allowed in income tax.

Case of Forder against Handyside.

"FORDER *v.* ANDREW HANDYSIDE AND COMPANY (LIMITED).*

"A sum set aside out of the net profits of a company, under the articles of association, for the purpose of meeting the depreciation of buildings, fixed plant, and machinery, is in the nature of capital, and cannot be deducted from the profits liable to income tax under Schedule D.

"This was a case stated under 37 & 38 Vict. c. 16, ss. 8 & 9, for the opinion of the Court, in the matter of an appeal of Andrew Handyside and Co. (Limited), against an assessment to income tax under Schedule D made to the Commissioners for the district of Morleston and Litchurch, Derbyshire.

Case stated.

"Andrew Handyside and Company (Limited), were assessed under Schedule D, for the year 1874–5, at £8642, the amount stated in their report as net profits. In the report for the year ending 31st July, 1874, being their first year of trading, £1509 7*s.* 6*d.*, part of this sum, was described as 'amount written off for depreciation of buildings, fixed plant and machinery.'

---

* 'Law Journal Reports' (New Series), vol. 45, Common Law, p. 809.

Part of gross profit set apart for depreciation.

"This sum of £1509 7*s.* 6*d.* was written off from the net profits, in accordance with the articles of association, by which (Art. 138) the directors were empowered 'from time to time, before recommending any dividend, to set aside out of the net profits of the company, such sum as they think proper, as a reserve fund for the purpose of meeting contingencies, or of purchasing, improving, enlarging, rebuilding, restoring, reinstating, or maintaining the works, plant, and other premises, or property of the company, or in furtherance of any objects of the company, and the same may be applied accordingly, from time to time, in such manner as the directors may determine. The reserve fund, or such part thereof for the time being as is not invested as hereinafter provided, may be used for the general purposes of the company. The interest of the reserve fund shall be treated as annual profits of the company.'

Appealed against by Surveyor of Taxes.

"The majority of the Commissioners being of opinion 'that persons in trade were equitably entitled to write off from their profits such a sum for depreciation, and that the amount claimed was fair and reasonable,' decided in favour of the company. The Surveyor of Taxes being dissatisfied with this decision, requested that the present case should be stated for the opinion of the Court, whether the company should be allowed the deduction of the £1509 7*s.* 6*d.* claimed by them for depreciation.

Deductions from profits for repairs

limited to an average of past 3 years.

"The statute 5 & 6 Vict. c. 35, Schedule D, imposes income tax upon the annual profits or gains arising from any profession, trade, employment, or vocation, and by s. 100 (1st case, 3rd rule), it is provided that 'in estimating the balance of profits and gains chargeable under Schedule D, or for the purpose of assessing the duty thereon, no sum shall be set against or deducted from, or allowed to be set against or deducted from such profits or gains, on account of any sum expended for repairs of premises occupied for the purpose of such trade, manufacture, adventure, or concern, nor for any sum expended for the supply of repairs or alterations of any implements, utensils or articles employed for the purpose of such trade, manufacture, adventure, or concern, beyond the sum usually expended for such purposes, according to an average of three years preceding the year in which such assessment shall be made, nor on account of loss not connected with or arising out of such trade, manufacture, adventure, or concern, nor on account of any capital withdrawn therefrom, nor for any sum employed in improvement of premises occupied for the purpose of such trade, manufacture, adventure, or concern, nor on account or under pretence of any interest which might have been made on such sums if laid out at interest, nor for any debts, except bad debts proved to be such to the satisfaction of the Commissioners respectively, nor for any average loss beyond the actual amount of loss after adjustment, nor for any sum recoverable under an insurance or contract of indemnity.'

"The case having been argued on both sides the Court gave a unanimous judgment for the Crown, and the deduction for depreciation was disallowed."

Effect of the above decision.

It will be seen from the statute recited in the foregoing case, that actual expenditure on repairs and renewals may be deducted from the gross earnings, if they do not exceed "what is usually expended for such purposes during an average of three years preceding," but that according to the decision of the Judges, Income tax was legally chargeable on money reserved to make good deterioration which had already occurred but which as yet had not demanded actual renewals.

The law altered in 1878.

The above decision manifested so clearly a need for an alteration in the law, that in the Customs and Inland Revenue Act of 1878 (41 Vict. chap. 15, section 12) it was enacted:—

Provision as to deduction for depreciation of machinery or plant.

"12. Notwithstanding any provision to the contrary contained in any Act relating to income tax, the Commissioners for general or special purposes shall, in assessing the profits or gains of any trade, manufacture, adventure, or concern in the nature of trade, chargeable under Schedule (D), or the profits of any concern chargeable by reference to the rules of that schedule, allow such deduction as they may think just and reasonable as representing the diminished value by reason of wear and tear during the year of any machinery or plant used for the purposes of the concern, and belonging to the person or company by whom the concern is carried on; and for the purpose of this provision, where machinery or plant is let to the person or company by whom the concern is carried on upon such terms that the person or company is bound to maintain the machinery or plant, and deliver over the same in good condition at the end of the term of the lease, such machinery or plant shall be deemed to belong to such person or company.

Allowance to lessor who maintains plant.

"And where any machinery or plant is let upon such terms that the burden of maintaining and restoring the same falls upon the lessor, he shall be entitled on claim made to the Commissioners for general or special purposes, in the manner prescribed by section sixty-one of the Act of the fifth and sixth years of Her Majesty's reign, chapter thirty-five, to have repaid to him such a portion of the sum which may have been assessed and charged in respect to the machinery or plant, and deducted by the lessee on payment of the rent, as shall represent the income tax upon such an amount as the said Commissioners may think just and reasonable, as representing the diminished value by reason of wear and tear of such machinery or plant during the year: Provided that no such claim shall be allowed unless it shall be made within twelve calendar months after the expiration of the year of assessment."

It is to be observed that the above Act provides only for an allowance in regard to the depreciation of Machinery and Plant and entirely excludes Buildings, and that the decision of the Commissioners as to the amount to be allowed is left without appeal.

The object of depreciation.

There are various methods of estimating the Depreciation of a Factory, and of recording alterations in Value, but it may be said in regard to any of them that the object in view is so to treat the nominal capital in the books of account, that it shall always represent as nearly as possible the real value. The most effectual method of securing this would be, if it were feasible, to Revalue everything at stated intervals, and to write off whatever loss such valuations might reveal without regard to any prescribed rate. By such a plan the deterioration due to a period of arduous working, or to an average or idle year, would be properly allotted.

Periodical valuation.

Where adopted.

Such a system is adopted oftenest in factories where the trade and plant are of so simple or uniform a kind as to allow it without difficulty. In some manufactories there are a few chief items of plant which are more important than the rest, and whose condition and value therefore need special consideration. Thus an iron-smelter may directly estimate each year the value of his blast furnaces and blowing engines, and for the miscellaneous or subsidiary plant be content to write a percentage off the original cost without a very close examination.

Chief items of plant valued.

This plan of valuing every year instead of adopting a depreciation rate, though it is the more perfect, if strictly carried out, has some disadvantages. The two leading considerations in such an appraisement are generally the condition of the machine or other appurtenance, and its earning power. In both these respects there may be absolutely no sign of deterioration; a machine may appear and for all practical purposes be as good as new, and may show proof of it by actual earnings. Yet none the less its working life is shortening every year, and unless some provision is made for a replacement a severe loss will fall on the future. And if, with this in view, something is written off the value, though no alteration is apparent, then the plan of a depreciation rate is really adopted.

Valuation difficult.

Where there is no sign of depreciation.

Manufacturers who abstain in the earlier years of working from writing off depreciation, because they may see no signs of a lessened value, might find it difficult to obtain the full value from an insurance company, in the case of destruction by Fire.

Fire insurance. *See page* 83.

For the above reasons, and because of the time, trouble, and expense it would involve, a system of annual valuation is seldom strictly maintained; and even where a balance of profit and loss is duly struck every year, an annual valuation of the plant may be deemed impracticable. The next best plan, which is that generally followed, and which it is intended now to investigate, is to establish average rates which can, without much trouble, be written off every year, and to check the result by complete or partial valuation at longer intervals.

Annual valuation seldom adopted.

Average rates of depreciation.

Before dealing in detail with the various kinds of property in a factory, and attempting to set up a mode of treatment and rate of depreciation appropriate to each, there are certain preliminary questions that need attention. First, the value of any building, plant, or apparatus, or

Deterioration other than by wear and tear.

aggregation of them, may be largely affected by circumstances outside of their physical condition, and it may be convenient at the outset to separate such circumstances from the wear and tear due to actual use. Among such circumstances are the Tenure under which the factory is occupied; the Permanency or steadiness of profitable employment which may be anticipated; the likelihood of New Inventions, processes, or machines coming into use which may supersede and render Obsolete those whose value or depreciation are in question; or vicissitudes and catastrophes which cannot be provided for by ordinary Insurance. Conditions and contingencies such as these, if they are to be estimated and provided for, may be said to demand a Reserve or Sinking fund, rather than a rate of depreciation, and in most cases it would be found desirable thus to isolate them in the accounts; but whatever be the precise method of doing it, they must be duly considered.

See below.

See page 15.

See page 16.

See page 17.

Reserve fund.
See page 50.

In regard to Tenure, if the factory be only rented by the occupier, then the sum to be provided for depreciation will depend partly upon the conditions of tenancy; and if the rent covers fair wear and tear, the occupier need only keep the plant that belongs to the landlord in working order for his own purposes. As, for instance, in cases where a tenant possesses looms or other machines while the landlord provides the workshop and engine-power, but leaves the current repairs to the tenant.

Tenure.

Rent may cover depreciation.
See page 73.

A more usual tenure is that under which the premises are built by the occupier on land held on Lease, with the usual condition that the buildings and the permanent Fixtures become the property of the ground landlord at the end of the term. Without here going into the legal question of what constitutes landlords' fixtures, it may be said that in the case of fixtures added to a building for purposes of trade or manufacture the law leans more to

Factory built on leasehold land.

Fixtures.
See page 99.

the interests of the tenant than in the case of ordinary house fixtures. Where the circumstances would admit of doubt, proper stipulations in the agreement of tenancy should have been made. There are, however, few trades in which, if the tenant has equipped the factory with plant, all of it can be removed by him.

See page 99.

See page 79.

Sinking funds.

In the absence of a stipulation that the landlord must release or pay for, such additions to the freehold, the provision of a Sinking Fund sufficient to give back the capital expended by the tenant becomes a matter of great importance. If the lease be for a long term, the annual charge, if it begin with the lease, will not be found burdensome, 3*s.* 8*d.* invested every year for 80 years at 4 per cent., as is the practice of insurance companies, procuring a return at the end of that time of £100; or $\frac{1}{80}$th part may be written off annually. Moreover, such a rate must not be considered as all due to the terminable tenure, because a freeholder would incur a considerable proportion of it—even if repairs be duly attended to—to compensate for the reduction in value due to time and use. In other words a depreciation rate would be necessary to compensate for wear and tear, and in the later years of a leasehold term, this would become merged in a sinking fund to repay all the capital.

See page 50.

Not all due to tenure.

Tenant's renewals limited.

But as under these conditions the tenant will feel under no obligation to give up more than the terms of his lease compel, he will, while maintaining the plant to the end of the term in sufficient order for his own purposes, abstain from replacing obsolete fixtures by new ones, and in regard to portions which are seldom used, may even let them wear out before the lease ends. Even if the occupier is to deliver up the factory in good tenantable condition, it does not follow that the repairs shall have been effected with so liberal a view to the future as the occupier might have as owner; nor is it to be assumed that fixtures fairly worn out in the work of the factory should be replaced by new ones. Therefore, as against his sinking fund, the occupier will, in the last years of his term, reduce the cost of maintenance.

Maintenance in later years of lease.

The Permanence or steadiness of profitable employment or the reverse has to be taken into account in deciding on the depreciation in the value of plant. A factory may be employed in some subsidiary trade, or in supplying some other undertaking which is not certain of continuing; or a patent, or a privilege, or a contract for a term of years may be near its termination. Owing to contingencies of this sort, which are too various to enumerate, the conditions of past successful working may be liable to such serious alteration or actual termination, that it is obvious a high rate of depreciation should be written off the plant, so as to bring down its nominal value to that which it will have under any such anticipated contingency. Again, a factory may have been erected to utilise a limited quantity of materials—timber, stone, or minerals—which when exhausted would leave machinery and plant of reduced value for removal. Here also an ordinary depreciation rate should really be supplemented by a Sinking fund so that the capital sunk in the plant may be recovered.

Permanency of employment affects value.

Removal of plant.

See page 79.

There are manufactures which, though they may be fairly considered permanent, are subject to violent Fluctuations, rendering plant idle for considerable periods. Such are the lace trade, and others depending on fashion. In calculating the cost of manufacture and the profit obtainable in trades such as these, a higher rate of depreciation should be assumed in years when the plant is in full operation to make up for idle years when little or no profits are earned; for though the actual deterioration during these idle years may be small, the chance of supersession by new inventions always continues.

Fluctuations in trade.

See page 35.

Again, the possibility of New Inventions, processes, or machines coming into use, which may supersede or render

Plant may become obsolete.
See page 78.

obsolete an existing plant, is a contingency that presses on many manufacturing trades, and especially on those which are of a new kind or in a transition state. This risk, which may be said always to exist to a certain extent, is one of degree, and in some trades it is the greatest risk of all. In some factories there is little risk of machinery becoming obsolete; in others the risk is confined to certain parts of the plant. Thus in an engineering factory, although steam engines, steam hammers, lathes, and other machines of a customary kind are subject to improvement, and may for particular purposes be superseded, they are of use in so many kindred trades that they have a value till worn out, even if at worst they have to be sold to other users. So also in a hosiery factory there are certain machines which have been proved by a long experience to be always required, while other of the machines may be liable to become obsolete. Invention is constantly being directed to automatic processes which may perform easily and mechanically what has hitherto been possible only with highly skilled labour or superintendence; and where radical alterations and improvements are being made from time to time in plant of a special kind, most of it useless for any other purpose, it would be unsafe to write off for depreciation the mere loss by wear and tear unless the rate on such a basis reduced the book value rapidly.

Customary plant always valuable.
See page 80.

Depreciation of obsolete plant.

New Inventions are generally directed towards a Saving in Labour and an Improvement in the product, and special plant, when once superseded by such inventions, may prove unsaleable as second-hand plant, except in so far as it may have a piecemeal or scrap value, because no reduction in price of the superseded machinery would balance the expenditure in labour its use would involve, or the inferiority of its productions. The risk may arise, not from improvements in the machinery, but from alterations in the kind of product, rendering new machines necessary to suit new

Obsolete plant unsaleable.
See page 78.

Nominal value should be reduced.

patterns or types. Contingencies such as these should encourage an ample reduction of nominal value in the early years of working, so as to bring down the book value of the plant to a point which will allow even of dismantling without serious loss. In such trades, profits should be large enough to allow for a liberal and rapid writing off of capital value. The same security is attained by the constant addition of new and improved machinery out of revenue; and undertakings in which the profits of prosperous times have been applied in this way in the renewal of plant rather than in the distribution of high dividends, have a considerable advantage, when trade becomes dull, in competing with rival undertakings burdened with an unrelieved capital account.

or maintained by additions.

Special risks needing insurance.

In certain trades there are other contingencies to be provided for before the net earnings can be fairly treated as profit, and though they do not strictly come within the scope of a depreciation rate, they may be referred to here. Such are risks which demand an insurance fund, but to which the ordinary systems of insurance are inapplicable. For instance, in or about a mine or quarry, there may be a risk of flooding, which would render useless the machinery and plant; or in a factory where highly inflammable or explosive articles are made, the risks may be so great or uncertain that no insurance company will underwrite them at any reasonable rate.

Reserve fund separate from depreciation.

But while as between a few partners it might be convenient to consider all these circumstances as part of one general system of depreciation, they would, in the case of numerous partners, or of a joint-stock company, be more properly provided for by a Reserve fund, stated in the accounts, and distinct from the depreciation by wear and tear. For, as it is impossible, by a mere annual writing off, to exactly balance uncertain contingencies, the grouping of all together may tell unfairly in either direction on the holding of those who have only a fleeting interest in the undertaking, or who cannot afford to stand by their investment to a future day.

Accounts made clear to sleeping partners.

To those who are concerned in the management, and who know the basis on which a general rate has been arrived at, the name by which the provision is stated may be a matter of indifference ; but to partners or shareholders who are unaware of the circumstances, a separate reserve fund will ensure a fairer valuation of their property ; and in case of a change or termination of the partnership, or of a cessation of the business, there is then a specific fund in hand which may even render a valuation unnecessary. But those who are responsible for the management sometimes prefer to include in the depreciation rate what is really a reserve or insurance fund, so as to disguise the economies they are practising, and avoid the claims of shareholders who might prefer to divide and appropriate an undiminished income.

Economies disguised by managers.

Investment of reserve funds.

In regard to Reserve funds, the question sometimes arises whether the money so set apart may properly be employed in the business itself, or whether it should be invested outside the business. If the object of the reserve be to provide ready-money for some sudden call, the latter plan may be expedient, but in a manufacturing business the reserve may generally be best employed in it. Money can seldom be safely invested so as to be immediately available and yet at a rate of interest as high as that which a manufacturer could afford to pay for the use of it. If some of the capital employed in the factory is borrowed, such a use of the reserve fund will go to diminish the need for borrowing.

in the business itself.

Increasing value of the site. *See page* 67.

The current of events may be the reverse to those just supposed. Thus, the value of the site on which the factory stands may be increasing in value by the growth of the town and neighbourhood, or the demand for the products of the factory may be increasing at a greater rate than the competitive supply, or the reputation of the factory may be increasing its trade and profit. But circumstances such as these, however much they may increase the real value of the undertaking and may justify a corresponding valuation in the case of change in partnership or sale of shares, cannot safely be set against actual physical deterioration of the plant. The latter, as a distinct and unavoidable circumstance, should be dealt with on its merits, and improvements in another direction be left to a subsequent valuation, when the real maximum value has to be ascertained.

Deterioration of plant still continues.

See page 66.

In a joint-stock company effect may be given to such assumed increase in value by the higher market value of the shares; further the original capital of a company may be increased under such circumstances by the distribution to the shareholders of new shares as a "stock dividend."

Stock dividends.

CHAPTER II.

DIVISION INTO CLASSES FOR DEPRECIATION.

Valuation as a basis for depreciation.

IN order to estimate correctly the alteration in value which the capital sunk in factory plant undergoes from year to year, it is necessary to have some record of the original value or cost as a starting point. If the factory has been bought, the price forms this basis; if it has been built and equipped by the occupiers, there will either be a record of capital expenditure, or if not, as frequently happens in factories which have grown up by slow and irregular additions, and it be desired to inaugurate a proper system, a valuation will be necessary, to which subsequent depreciation rates can be applied. It may be that each annual review will show a growth of value by mere extension even after deducting for deterioration; but it is important to take strict account of the latter, so as not to allow the nominal capital to be unduly swelled.

See page 48.

Prescribed rates of depreciation.

In some undertakings, not only the method, but the rate of depreciation is fixed in the deed of partnership or articles of association. It may have been a wise precaution to agree upon the principle of writing off, and even to fix a minimum rate, but it is obviously impossible to thus decide in advance on an absolute rate. Sometimes it is prescribed that deterioration by time and use shall be met by applying a fixed proportion of the profits to make good what has been lost. This method is more frequently adopted in the articles of joint-stock undertakings in France than in England; but it is obviously

Fixed proportion of profits written off.

unsound, as deterioration goes on even if no profits are being made. A percentage on the output or cost value of the products would be a better plan, and by referring to the accounts of preceding years a fair rate from this point of view may be established. While, however, this is useful, and indeed necessary, in estimating the cost of future production, it is not the best for dealing with the past. A percentage on the capital value as it was left at a previous review is for this purpose the most suitable. The sound plan is to write off this percentage in every year, besides charging to revenue the expenditure for repairs. It is, however, quite proper in determining the rates of writing off for any year, to take into account the activity or slackness of certain departments. Credit has also to be taken in the plant account for actual renewals and additions which have been made.

Writing off in proportion to output.

See page 45.

Repairs charged to revenue. *See page* 46.

It must always be remembered that to depreciate plant is to provide for contingencies as well as for the rate of wearing out which may be immediately visible. Therefore, till a factory has been working for many years, any rate of depreciation must be tentative and subject to occasional adjustment. If a very low rate be adopted and yet after a course of years be shown to have been sufficient, it does not follow that the original adoption of such a rate was prudent. The risks have been run, and should have been provided for.

Rates subject to adjustment.

The great diversity of system renders a comparison between the practice in different factories difficult. In one, the greatest attention will be paid to repairs; renewals and even extensions will be effected out of revenue, and little or nothing written off for depreciation. In another, there may be apparently an ample provision made in the capital account for depreciation; but repairs may be neglected, and a too liberal addition may be made to capital for so-called new plant.

Comparison of factories difficult.

To facilitate a correct estimate of deterioration it is expedient in many undertakings to divide the property into classes and to deal separately with each. Sometimes it is preferred to write off at one average rate from the whole of the sunk capital; and, if this average happens to be a fair one, the method has the advantage of simplicity. But simplicity is its only merit, and it has many drawbacks. Buildings and machinery generally require very different rates; and although a fair average may have been established, this is liable to be affected by the vicissitudes of particular years, and without modification may lead to considerable error. For instance, the manufacturing work of one year or a series of years, may have told more severely on certain parts of the plant or buildings than on other parts, and if the wear and tear due to such work have not been sufficiently noted, estimates for future operations of a similar kind, which allow only for the previous depreciation rate, may prove erroneous.

Division of plant into classes.

Average rates liable to error.

Wear and tear not duly allotted.

There are frequent instances of factories engaged in multifarious operations, where a certain total result of profit is obtained, concerning which little or no investigation is made to ascertain to which branch of manufacture it is due. And in the absence of a proper analysis, the most remunerative class of operations may be neglected, or contracts taken in other branches at prices which would show a loss if the deterioration of plant due to them were properly allotted. As a corollary to the foregoing, it should be held dangerous to establish an average rate merely because it has been found appropriate in some other factory apparently similar, unless the conditions are exactly alike.

Analysis of profit and charges.

Equal instalments of original cost written off.

Sometimes an equal instalment from the original value of the plant is written off every year; sometimes each machine or item of plant is considered separately; but it is more usual to write off a percentage, not of the original value, but from the balance of the plant account of the preceding year. Thus, if at the end of the first year 10 per cent. has been written off £100, then the 10 per cent. will in the second year be written off £90, and so on. Additions made within the year go, however, to neutralise such reductions, and in many cases to increase the actual total capital value.

See page 45.

Division into classes.

When dividing into classes the capital sunk in manufacturing plant, it is desirable, on the one hand, to have various distinct general categories; on the other hand, a minute subdivision is generally impracticable and inconvenient.

Example of classification.

The following is an example of the classification frequently adopted in factories:—Preliminary expenses; Land, including adaptation; Buildings and wharfs; Fixed plant and machinery; Steam engines, boilers and furnaces; Small loose plant and tools; Horses.

Preliminary expenses

show no available asset,

In establishing a new manufactory there is often an outlay of capital for Preliminary Expenses, giving no actual asset in buildings, plant, or other tangible property. Such are the legal expenses connected with the formation of a joint-stock company, and in some cases there are the expenses of obtaining an Act of Parliament. Outlay of this kind may be just as necessary to the purpose in view as any other part of the expenditure, and may have been foreseen and reckoned on as part of the required capital. While, however, the earnings of the factory may, so long as they continue, afford a profit on such accessory outlay, the latter may be quite valueless as an asset in the event of the undertaking being wound up or sold, and therefore it is generally deemed prudent to cancel quickly this portion of the capital by writing it off annually out of the earlier earnings.

should be quickly cancelled.
See page 46.

Cost of goodwill written off.

If the undertaking has been purchased as a going concern, and a specific sum paid for Goodwill, somewhat similar considerations will arise. No rule can be set down for a rate of depreciation for this purpose. If the amount be small, it may be wiped off at once out of the earnings of the first few years, or it may form a legitimate object to which to apply the surplus profits of a prosperous year. But there are often cases where it would be unfair, as between partners, to write off entirely out of present earnings an outlay which was necessary to the establishment of the business, and of which, therefore, future earnings might justly bear a share. There are also cases where the goodwill forms so real and important an asset that it would be erroneous to cancel it in the capital accounts. Such a case for instance occurs when the name, or trade-mark, or brand of a manufacturer, has been so long or widely established as to ensure a regular or profitable flow of business.

Goodwill a valuable asset. *See page* 69.

Trade-mark.

Expenses of land purchase.

Where preliminary expenses have been incidental to the purchase of Land which has since undoubtedly risen in value, such an increment may be held to sufficiently balance the expenses, which may then need no other consideration, as a sale at any future time would recoup the original outlay. So long, however, as the facts are correctly recorded in the books—so that in the case of a change in partnership or sale of shares the reduction which has been made in the burden of capital, and the enhanced value of the shares, will not be lost sight of—the writing off of all preliminary expenses is a distinct advantage.

See page 19.

CHAPTER III.

LAND AND BUILDINGS.

Land maintains its value,

LAND occupied by a manufactory generally maintains its full value, and no provision for depreciation is necessary. In England, especially in large towns, the tendency is towards a growth in value; the factory itself may have become the centre of an industrial population engaged in kindred and contributory trades, while the construction of railways, docks, and other facilities for transport may largely increase the value of the site. More than this, the expenditure for clearing and preparation of the site, as well as the formation of roads and wharfs may have added a more than corresponding value to the land.

especially in large towns.

Site may become too valuable for factory.

Where a factory originally built in an open neighbourhood has been long established, it may have become so surrounded by a growing town as to have acquired value as a site for other classes of buildings entirely disproportioned to its original purpose; and in large cities it constantly occurs that a factory may be dismantled, and the site sold for a price high enough to pay for the building of a larger and better factory elsewhere, on a more commodious site.

See pages 65, 68.

Revaluation of site.

While, however, it may be equitable in the case of a change of partners or business to revalue the site, or take into account its prospective value, the possible increment should not be mixed up with the annual accounts of the undertaking farther than to justify the maintaining the capital value of the land itself without

Value of land kept separate from plant.

depreciation. If nothing be written off the value of plant, although obviously deteriorated, on the plea that the increased value of the land balances the loss, a profit thus shown is obviously not due to the manufacturing trade. A division of profits from this source may, however, be temporarily justified in a time of depression, to allow of a moderate interest on capital, but even in that case the facts should be shown in the accounts.

Land may fall in value. *See page* 68.

But although the land in towns tends to rise in value, there are occasionally cases where its value may depreciate. Thus, the growth of the town, or the opening out of railways and roads in a new direction, or a change in the locality of the trade, may leave the factory isolated or unfavourably placed. So, again, when a trade has prospered because of its contiguity to a certain port, a diversion of imports or exports may diminish or destroy the trade of the factory. Again, where a particular industry has flourished because of favourable customs duties either at home or abroad an alteration in the tariff may entirely alter the course of trade.

See page 106.

See page 107.

Factory dismantled and land sold. *See page* 79.

Thus it might prove necessary, if the factory were to be sold, to dismantle it for a more appropriate purpose in order to restore the land to its natural value. Even while the manufactory is still a going concern, it might be prudent to write off something from the original value of the land so as not to leave all the burden of the loss to those who might be proprietors at a time of change. Sometimes depreciation is necessary, not because of any real falling off in value, but because the land was bought in a time of inflated prices. As a general rule, however, no depreciation rate is needed for the capital sunk in land and its adaptation.

See page 68.

See page 46.

Buildings may be considered to include all structural additions to the land, and therefore, not only workshops and offices, but wharfs, railways, and tramways, may for the present purpose be placed in one category. It very often happens that in the accounts of manufactories no allowance is made for deterioration of buildings, it being considered that if kept in proper repair they are permanent. The term of endurance depends primarily on the solidity and quality of the original work, and thereafter on the attention paid to repairs. But besides current repairs, there must also be partial renewals from time to time, at intervals far apart in the early years of the undertaking, but shorter as the factory grows older. This would tell heavily, and perhaps unfairly, on the interests of those who happened at the later period to be proprietors, unless some provision had been made by writing off some of the value in the early years.

Deterioration of buildings

Durability, how determined.

Necessity for writing off.

An undue cheapness in construction shows itself after a few years of working; or an alteration in the trade of the factory to heavier work than that for which the buildings were designed, may tend to weaken and destroy them.

In reckoning the proper rate of depreciation for buildings of brick or stone, they may be divided broadly into two classes, as those subject only to ordinary deterioration from time and weather, and those which suffer also from abrasion, concussion, or other special incidents of working. In an engineer's factory, for instance, the pattern shops, fitting shops, lofty chimneys, storehouses, and offices might come in the first division; while the foundry, smithy, and, in some heavy trades, the machine shops and erecting shops might, as being liable to rougher usage, be placed in the second. And even in lighter trades, if quickly-running shafting or machinery be attached to the walls or roof framing, the effect on the building may be injurious.

Wear and tear of buildings.

Rough usage of buildings.

If proper attention be paid to the roof-covering as well as to the painting of ironwork and woodwork—the expenditure being all made out of revenue—a depreciation rate of

Rate of writing off. *See page 52.*

1¼ per cent. would suffice in the first class, so reducing each original £1000 to £686 in thirty years, and a rate of 4 per cent. might be appropriate for the second class, reducing every £1000 to £665 in ten years. If, then, at the end of these thirty and ten years respectively £200 be spent in a thorough renewal, this new expenditure might be properly added to the capital value, and the writing off for depreciation go on again. In most factories an average of 1½ per cent. for buildings will generally be found appropriate if due attention is paid to repairs. Such a rate will bring down a value of £1000 to £635 in thirty years.

Amount written off applied to renewals.

Average rate for buildings.

Wood buildings.

Buildings of wood or iron would require a higher rate, ranging from 4 to 10 per cent., according to the design and solidity of the buildings, the climate, the care and the regularity of the painting, and according, also, to the usage they are subjected to. Thus, strong wooden buildings in a cold dry climate might last almost as long as brick structures, while light wooden sheds in England would not last one-sixth as long. Strong well-fitted iron buildings will last as long as brickwork if properly painted, but the cheaper kind of iron buildings, on light columns, with loosely fitted roof framing and covered with corrugated iron, galvanised, but unpainted, would in a damp climate be so wasted by rust and shaken by the wind, that they would be quite worn out in from ten to twenty years, the old materials being then almost worthless.

Iron buildings.

In factories where such operations as melting, hammering, and rolling of iron are carried on in buildings of the last-mentioned sort, a depreciation rate of 5 per cent. would be quite inadequate; and even substantial brick buildings subjected to the vibration due to steam hammers and the strains of heavily loaded cranes might require, even though current repairs were attended to, a rate of 5 per cent. to provide for occasional thorough renewals. In any case, the object in view in deciding upon the system

Wear and tear in ironworks.

and rate of depreciation should be to have always a book value not exceeding that which a fresh valuation would give ; and periodical valuations may be required to show whether an increased or diminished rate was necessary for the future.

Depreciation balanced by renewals.

The question as to how far the expenditure on current repairs and renewals would alone meet the case, depends, as has already been stated, a good deal on the size or extent of the factory. Thus in large and long-established works, a certain proportion of the whole might be renovated and even rebuilt every year, and this, if done out of revenue, might render a depreciation rate unnecessary. But in a small factory, or one recently established, such renewals might not become necessary for many years, and a depreciation rate, dividing the loss over many years, would be needed to accumulate a fund to be drawn upon in the future. The risk of error is greater when divided over many years than in those cases where the annual outlay shows clearly the fleeting value of the buildings.

See page 2.

See page 7.

Furnaces and ovens, which wholly or in part, are actually destroyed by the operations of manufacture, obviously demand a special system of depreciation or a reserve fund, particularly where they are too few to give an annual average of renewals.

Wharfs and railways.

Wharfs and railways should be maintained out of revenue, but unless they be of large extent, thus ensuring every year an average expenditure for renewals, a rate of depreciation will also be necessary, which will, in effect, serve as a reserve fund. For instance, if there be works of this kind having an original cost of £1000, a rate of 3 per cent. will in ten years reduce the book value to £737. If then £200 be expended on actual renewals, such as sleepers, rails, and masonry, this new outlay may be properly added to the book value, and the same rate of depreciation be continued. Where the quantity of rails is

See page 48.

sufficient to be classed as a separate item, it is generally considered prudent to write the value down to that of old iron or steel, and there leave it, the capital account being brought back to its original amount by future renewals. The circumstances which arise from a limited tenure, or in regard to fixtures as between landlord and tenant, are referred to elsewhere and sometimes involve legal questions which need not be dealt with here. *See page* 99.

CHAPTER IV.

PLANT AND MACHINERY.

Plant kept separate from buildings.

FIXED plant and machinery are sometimes included in one category with buildings, and an average rate written off the whole. It is, however, the purpose here to consider them separately, and this is necessary as a primary step even if an average rate is to be adopted.

Extreme limits of value.
See page 80.

The highest value.

There is a wide range within which values may alter, but a proper estimate may be approached, and the issues narrowed by regarding first the extreme limits of value. For instance, the highest value of any machine will be the cost of a similar machine, ready for immediate use, together with the expenses of installation. If invention and skill have been bestowed on any additions, a higher value may have been reached than is represented by the original cost and the subsequent outlay, and this notwithstanding that the machine is partly worn. The best proof of efficiency in a machine may be afforded by actual working. Such a proved value may be again increased by surrounding circumstances, such as that, as part of a going concern, profitable employment is assured, or that the readiness of the machine for immediate use gives it a value above that of a new machine, which would take time to get into working order. But these latter considerations, while demanding full weight in the case of valuation on a change of ownership, cannot properly affect a scheme of depreciation for wear and tear.

Efficiency proved by working.

See page 61.

The lowest or scrap value.

The lowest extreme is represented by the "scrap" value, or the price which may be depended on for the old materials. The relation which this lowest value bears to the original cost obviously depends on the proportionate value of the materials and that of the labour that has been bestowed upon them. Articles of copper and brass may have a scrap value approaching nearly to the price when new. So also may articles of cheaper materials if of a simple kind. Thus, old rails, or railway chairs, may be worth as scrap iron half their original value. On the other hand, the scrap value of light and intricate machinery may be a mere fraction of the original cost. Again, the value of old material is sometimes greatly reduced by the cost of preparing it for re-use; such is the case with the removal and breaking up of cumbrous and heavy ironwork.

Valuable scrap.

Scrap expensive to utilise.

Circumstances such as these must be taken into account, for the main factors in calculating a rate are—1. The Original value; 2. The probable working Life; 3. The Ultimate selling value when worn out or superseded. Therefore, in deciding upon an appropriate rate of depreciation, which will in a term of years provide for the estimated loss, it is not the original value or cost which has to be so provided for, but that cost less the ultimate or scrap value.

Depreciation rate, how based.

With machinery as with buildings, the first years of working show, in many cases, little or no reduction in value, and yet it is clear, that however long the working life is to be, it begins to shorten from the first, and the value must be depreciated accordingly. But this principle has to be applied with considerable qualification where repairs really renew the life of the machine and prolong greatly its period of useful work. For instance, a locomotive* during its life may have its wheel tires renewed four times, its boiler three times, and be painted seven times, so that before the framework, the wheels,

Deterioration not apparent in first years.

Frequent renewals of same machine.

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* R. Price-Williams on "Rolling Stock." (See footnote, p. 3.)

and other more durable parts fail, and the engine is broken up, much more than its original cost will have been expended on it; the value of such renewals should be duly credited in a proper system of depreciation.

as in locomotives.

In the case of fixed machinery, worn out or superseded, it must always be borne in mind that the adoption of any new machine not only involves the cost of purchase, some of which could be recovered by an ultimate re-sale of it, but also the additional expense for installation; the latter outlay being irrecoverable, and only remunerative to the purchaser by the continuance of working.

New machines involve cost of installation.

The Deterioration of machinery depends on many circumstances, some of which relate to the Machine itself, and others to the mode of Using it. First, as to the machine itself, its quality, and the skill with which it has been set up affect its durability. In the case of a machine which has to withstand concussion or strains, the weight of the framework or other fixed parts must be sufficient to absorb the shocks of impact without undue vibration. Where the inertia of the framework is insufficient for this, oft-repeated strains will render the machine unsteady or untrue, and will destroy its efficiency long before it is in other respects worn out. The same unsteadiness may result if the machine is insecurely attached to its supports. In this respect velocity has to be considered as well as the force of the blows. A frame strong enough to absorb a certain strain may deteriorate if the strains are rapidly repeated. For slow speeds, an approximate balancing of the moving parts may suffice, while for high velocities, when the slightest inequalities are intensified by the speed, exact balancing and the most accurate fitting are necessary to prevent the machine or its supports being shaken loose and destroyed. If wearing parts have not been properly hardened, or if arrangements for making good the wear or

Durability, how determined.

Concussion and impact.

Effect of velocity.

Renewal of wearing parts.

for inserting new parts have not been provided, the effective life of the machine may be limited to that of the wearing parts.

Cleaning, painting, oiling.

Care in management goes far to determine the durability of a machine. Protection from dirt or injury, periodical painting, and lubricating with good oil, may render one machine twice as durable as a similar one in which these precautions are neglected.

Hours of work.

Effect of overtime.

The hours of actual work have also to be considered in comparing the deterioration of one machine or factory with another. In some factories overtime is the constant practice, and the wear and tear correspond. This would be duly met if the reserve fund or depreciation rate were proportioned to the output; but under the usual plan of writing off annually a certain part of the capital value, the deterioration due to incessant working would not be provided for by a rate appropriate for ordinary working.

Severity of working.

Undue straining.

Piecework.

Precautions against over-working.

Severity of working has to be taken into account as well as the hours of work. A certain margin of strength being given to a machine, there is a wide range within which it may be forced to its great detriment, without actual risk of accident. Thus a steam boiler or engine may be worked with a higher pressure of steam than its designer intended, or toothed wheels be made to transmit greater power; or machines intended to deal with light materials, or to manufacture light goods, may be set to work on heavier materials and goods. Where production is stimulated by a system of piecework, the deterioration of the plant is likely to be more rapid than in a factory where the workmen are paid according to time only. Safeguards can be provided against excessive strains, yet when the labour of the workmen may be lightened, or their wages increased by forcing a machine, special care must be taken that the precautions are observed. Thus safety valves in boilers may be locked, registers of speed rendered inaccessible to the workmen, and other similar mechanical arrangements provided.

Forced working profitable.

In very busy times, when there is a pressing demand for the products, and profits are large, it may be expedient and remunerative to work long hours, and to force the plant and machinery to their utmost power, even at the risk of a breakdown, so as to take full advantage of the transient high prices ; but in such a case a corresponding rate would have to be written off for depreciation.

Machines seldom used.

There is often in a factory some large or special machine which, though necessary to the execution of certain occasional work, is seldom used. The deterioration of such a machine is therefore slow, but as a machine seldom needed is not so saleable as one of an accustomed kind, it is best to include it in the general depreciation rate.

Depreciation in small factories,

less apparent than in large factories.

In small factories, where the purchase of new machines occurs but seldom, it is particularly important to provide for such outlay by an annual depreciation rate. In large factories, the purchase of new machines and the renovation of old ones are so frequent that the loss by deterioration is made manifest; the danger in these larger undertakings being that too much of the expenditure for renewals may be added to the capital value. If in an ironworks there be six steam hammers, it is probable that each year one of them may require extensive repairs, such as a new piston-rod, or cylinder, or anvil, while every second year a new hammer may have to be bought. Such outlay, if all defrayed out of revenue, might balance the average depreciation of the whole ; but in a small factory, where only one steam hammer is employed, an annual depreciation rate would be required to balance the outlay when it comes.

Numerous machines afford an average.

Value restored by renewals. *See page* 47.

Discrimination is needed in allotting these charges, for, while it is prudent and necessary to provide for renewals by an accumulated fund, the expenditure when it comes may be fairly considered as tending to restore the capital value. For a liberal rate of depreciation in preceding years will have brought down the book value of the plant to a point corresponding with its worn condition.

Plant may become obsolete. *See pages* 16, 78.

Design and size of product may vary,

as in rolled iron,

or foundry patterns.

See page 41.

The risk of the plant becoming obsolete before it is worn out has already been referred to. Sometimes where a machine as a whole may continue serviceable, important parts may become obsolete. Thus, in an iron-rolling mill, new rolls may be cut to produce a certain pattern of bar iron, and if this pattern be of a standard shape and size constantly in demand, the rate of deterioration may be based on its probable durability and the number of tons of iron which the rolls will produce before they are worn out. If, however, the pattern be peculiar in shape or size, a higher rate of depreciation is necessary; indeed, it may be proper to charge the whole cost of the rolls to the first lot of bars produced. In this respect the rolls must be treated like foundry patterns, which are in some cases charged to one set of castings for which they have been specially made, and in other cases, as stock or standard patterns, are properly charged to capital. There are numerous other industries where a large proportion of the cost of manufacture is for the design and patterns, and a due depreciation in value is always of great importance.

Systems of depreciation vary.

Low rate may prove sufficient.

In regard to the proper rate of depreciation for machinery, there is, even in well-managed factories of similar class, a wide divergence of practice. Thus, in a new factory doing a profitable business, private partners will, in their desire to be on the safe side, sometimes commence by writing off annually 10 per cent. from machinery of all kinds. Unless there be some apprehension of the plant becoming obsolete, this is generally too liberal a rate for fixed machines, unless it is neutralised in some other way. In other cases, the records of many years' working may show that 2½ per cent. is sufficient, because the machinery was good in kind and quality to begin with, partly also because the expenses of installation and of liberal repairs have been defrayed out of revenue, and partly because the machines have been moderately worked.

Engineering factories.

In engineering factories the rate which will probably meet the deterioration will generally be found between 5 and 10 per cent. Where the work is of a moderate kind which does not strain the machines severely, and where the hours of working do not average more than sixty per week, 5 per cent. would generally suffice for machinery, cranes, and fixed plant of all kinds, if steam engines and boilers be excluded. Where there is a diversity of machinery and plant, and the past accounts of twenty years to refer to, it is not difficult to arrive at an appropriate rate and to make periodical revisions.

Average rates.

Repairs and renewals.

Repairs and renewals are sometimes of such a kind as to increase the value of plant, and nothing need be written off; while in other cases a very low rate will suffice. For instance, in the case of blast-furnaces no deterioration may appear to take place for the first two or three years, and the expenses afterwards will be mainly those due to relining. As such expenses must obviously be defrayed out of revenue, a depreciation rate of 5 per cent. will generally prove sufficient, but it should take effect from the commencement, leaving any modification of the rate to be considered after a period of ten years. Such a rate as 5 per cent. would, however, be quite insufficient for the machinery of a rolling mill. For while a rate of 7½ per cent. may be appropriate for the first four years, a valuation at the end of that period may show that some rate between 10 and 20 per cent. will be necessary to meet effectually the depreciation in value due to wear and tear, and to the fact that the machinery is likely to become old-fashioned.

Blast-furnaces.

Rolling-mills.

Steam-engines and boilers. Steam-engines and Boilers, if classed separately from the other machinery of a factory, would generally require a higher rate of depreciation, and if again separated, boilers a higher rate than engines. Well-made, slowly-working engines engaged in regular work will, if properly maintained, occasionally last for fifty years. But in the great majority of cases no such durability can be reckoned on. **Wide variation of durability.** So wide is the possible variation, that special examinations of engines and boilers should be made at each annual balancing of accounts.* If a well-made non-condensing stationary engine with Lancashire boiler cost, including foundations, **Rate for engines.** £500, it would be prudent to write off 7½ per cent. the first year, and 7½ per cent. annually from the diminishing value, **Repaired out of revenue.** this being sufficient if the minor repairs and renewals, such as new brasses and fire-bars, be paid for out of revenue. *See page 52.* At the end of ten years the book value will stand at £229. If, then, the cylinder be re-bored, possibly a new piston supplied, and the boiler renewed by the insertion of a new **Value partly restored.** furnace, at a total cost of £80, this sum might be added to the capital value, the depreciation rate of 7½ per cent. continuing for a farther five years till the value is reduced to £209. A new boiler would probably then be required costing £200, and the rate of 7½ per cent. again go on on the renovated value of £409.

Portable engines wear out rapidly. Portable engines with multitubular boilers are liable to rapid deterioration, and there is a wide range of difference in durability according to the treatment they are subjected to. Engines of this sort when used for temporary purposes can seldom be so well protected and managed as when permanently fixed in a clean well-ordered workshop. Thus an annual rate of from 10 to 15 per cent. would be necessary as a commencement. A rate of 15 per cent. would in five years reduce an original value of £300 to £133. **Repairs and renewals.** If, then, £50 be spent on repairs, the book value might be increased to £183, and the 15 per cent. rate go on, so that at the end of another four years the value would be reduced to £96. If then patched up at an expense of £50, it might at a low pressure of steam last a few years longer.

Durable engines.

On the other hand there are cases where, for well-made, well-managed engines of this class, 10 per cent. would be ample, such a rate reducing £300 to £177 in five years. No exact rule can, however, be made for steam engines of this kind. The deterioration depends first on the size of the engine—small sizes wearing out quickest; on the care in firing and kind of fuel and water; on whether the working is forced; on the care given to repairs; on the protection from dirt; and on the hours the engine is kept at work. In extreme cases a portable engine is quite worn out in five years, and its value to be broken up would be about one-twelfth part of its original price.

Causes of wear in portable engines.

Contractors' locomotives.

Contractors' locomotives working on imperfect railroads soon wear out, and a rate of 20 per cent. is generally required, bringing down the value of an engine costing £1000 to £328 in five years. Whatever be the exact rate adopted for steam-engines, it should be estimated liberally for the first five years. Revision will then show if the rate needs alteration.

Boilers and furnaces.

In trades where steam engines, steam hammers, furnaces, and boilers, form a large proportion of the total plant, they should either be classed separately from the other machinery, or the rate appropriate to them should determine that for the whole. But in engineering factories, an inclusive average rate is generally adopted, which, as already stated, will generally be found between 5 and 10 per cent.; but even from this average it is sometimes considered expedient to exclude certain things, such as patterns and foundry boxes, which may either be included in loose plant, presently to be referred to, or be classed separately.

Average rate.

See page 41.

Before, however, leaving this part of the subject, it may be repeated that the slower the deterioration, the greater the importance of establishing a proper system. Where

Rapid decay self-evident.

the deterioration is rapid, as in boilers and furnaces, the need for renewals forces itself on the attention of users, and the justice of charging expenditure on this account to revenue is so obvious that any other plan, though it might be deemed merely delusive in the case of private firms, would in the case of joint-stock companies be rightly considered dishonest. Where, however, the deterioration of plant is

Slow decay unnoticed.

slow, an insufficient rate of depreciation may by mere inadvertence go on for many years before the error becomes apparent; and the loss, when at last it is realised, too often falls upon the wrong shoulders.

Loose plant excluded from average rate.

Loose plant and Tools can seldom be satisfactorily treated in the accounts by the system just described for buildings and fixed plant. They wear out too quickly, and writing off a percentage annually is not a satisfactory method when the rate would exceed 20 per cent. There are two other methods available. One is to value the miscellaneous loose plant every year, and the other is to

Renewed out of revenue.

write off nothing, but to maintain and renew entirely out of revenue, revaluing occasionally, say every fifth year; or, as a third plan, part of the loose plant may be treated according to the first method, and part according to the second.

Such a system is carried out in some engineering factories by dividing the loose plant into classes somewhat

Classification of loose plant.

as follows:—Foundry boxes; foundry Patterns; rapidly wearing plant, such as iron and steel Tools, belting, chains, ropes, portable forges, carts, wheelbarrows and ladders; Horses.

Foundry boxes

Taking these in their order, a list is kept of Foundry Boxes, and this is assisted by casting on each box the year in which it is made, and marking on each its weight

written down to value of pig iron.

Example.

The value is, in some factories, at once taken as that of pig iron, but more often is written down to that level in a few years. Supposing one box has been made, weighing 1 ton, at a cost of £12, then, if it is of a shape or size not likely to be wanted again, all the cost—less that of the iron—should be charged to the first set of castings, and the box at once broken up. But if the box be considered useful enough to keep for future use, one-half or even less may be charged to the first castings, and the remainder treated as an addition to capital; but this remaining value should be written down in three years to pig-iron value.

Old and new boxes averaged.

See page 61.

Machine moulding boxes.

Another and simpler plan is to value all the boxes, old and new alike, at 20*s.* per ton above pig-iron price—that is to say a moderate average price, and not that which may be current at the time, although of course the current price would need consideration in case of valuation for a change of ownership. This summary method does not apply to the elaborately fitted boxes specially prepared for the processes of machine moulding. Such boxes may be properly classed among machine tools, and depreciated accordingly, but at a liberal rate as they wear out quickly.

Foundry patterns

seldom of permanent value.

Storing of patterns.

See page 71.

Foundry patterns may be taken as a type of the patterns or designs necessary in so many trades, and involving much cost not easily dealt with in the books of account. As a safe general principle or starting point, every casting or set of castings should pay for its pattern; and where some exceptional or peculiar shape is to be made, with no immediate prospect of using the pattern again, this is necessary if loss is to be avoided. There is a natural reluctance to break up costly patterns, and an equal reluctance to treat them as valueless. The storing of them is often continued for many years without return, and ultimately the patterns are broken up for firewood or scrap-iron, as the case may be. Much depends on the nature of the trade, whether of a repetition or miscellaneous kind.

Expensive patterns.

It is often expedient in a repetition trade, where a succession of orders may be reckoned on, to spend much money on the patterns, which may have a value many times that of the castings made from them in the first year. Even, however, if durable iron patterns have been made, they often become obsolete before worn out, and therefore should be quickly depreciated.

Wheel and pulley patterns.

Toothed wheel and pulley patterns may be said to have a permanent value; but since the introduction of wheel-moulding machines it is much less common to store such patterns. Many expensive patterns, especially of an ornamental kind, have a value quite dormant, because they are unknown to purchasers; and it is for this reason that the publication of illustrated catalogues may give life to a stock of patterns otherwise useless. But while this may extend the time over which the cost is to be distributed, the value should generally be written down to one-tenth of the cost in ten years. If not used often they have little value; if used often they soon wear out.

Value increased by cataloguing.

Copyright designs. *See page 70.*

Copyright designs or patterns protected by patent may, of course, have a special value; but, as between partners, this should be written off rapidly, as such rights last only a short time. In the case of a change of ownership a new valuation should be made. In this category should be included the engraving blocks used for catalogue illustrations.

Loose plant valued at half cost.

In regard to the miscellaneous and minor Loose Plant previously enumerated, if depreciated by an annual percentage rate, one of 50 per cent. might be necessary, which would be inexpedient. It is a simple and better plan to value all, old and new alike, at half their original cost; such a plan being assisted, in the case of tools, chains, and other articles of iron and steel, by weighing them. The other and simpler plan is to attempt such valuation only at intervals of three or five years, and to take credit in the accounts for the last

Occasional valuations.

preceding valuation, on the assumption that if the constant renewal of loose plant be entirely defrayed out of revenue, the aggregate value will never diminish. The tendency will indeed probably be upwards in the case of a growing factory; and the proportion which the annual capital account for fixed plant bears to previous years will afford the necessary check. If the fixed plant has increased notwithstanding an annual writing off, it is generally safe to assume that the loose plant is also growing in value. By this plan of writing off nothing from loose plant and adding nothing to the capital account for new purchases, the articles so treated may be regarded as consumable stores.

Value of loose plant constantly renewed,

without writing off.

Horses deteriorate more rapidly than the inanimate fixed plant of a factory, and need a special rate or system of depreciation, for it is obvious that contingencies have to be provided for which would not occur in the case of machinery. Assuming that sound, well-seasoned animals have been purchased, that they are well cared for, and that all veterinary expenses are charged to revenue, an annual depreciation rate of from 15 to 25 per cent. will be necessary to provide a fund for renewals. Between these wide limits, the exact rate will be found to depend on the conditions of working, principally on the kind of roads. On the paved streets of a city the deterioration will be more rapid than on macadamised roads, and especially if the horses have to trot on the paved streets. The experience of omnibus proprietors, tramway companies, and others, shows that the working life of a horse is from three to six years, according to the care paid to feeding, shoeing, stabling, and moderate working; while the easier conditions under which the carting work of a factory may be performed would allow a life to the horses of from five to ten years. Taking all risks into account, a liberal rate should be adopted till the experience of a course of years

Horses.

Rates of depreciation.

Working life, how determined.

had shown whether a lower rate sufficed, or whether a higher rate was necessary to maintain the original capital value by the purchase of new animals.

Horses excluded from depreciation rate.

Horses, like the loose plant just referred to, may in many cases be excluded with advantage from the general depreciation rate, and either the plan of an annual valuation be adopted, or that of maintaining the full value by purchasing new horses out of revenue. The latter plan is the simplest, and is safe if the horses are numerous enough to allow a fair average of annual expenditure. Cartage is generally an uncertain and unsatisfactory expense in connection with a manufacturing business, and the tendency in modern factories is to avoid the use of horses by constructing branch railways, by using hydraulic or other capstans for haulage, and in the factory itself by mechanical traction.

Cartage.
See page 109.

CHAPTER V.

EXAMPLES AND TABLES.

Depreciating by percentage rates explained by tables.

THE method described in the preceding chapters, by which the original value of factory plant is depreciated by writing off annually a percentage from the capital amount as it appeared in the accounts of the preceding year, may be further explained by the following tables and examples :—

Table I. explained.

Table I. on p. 52 shows the effect of different rates of depreciation for any term up to 30 years, and also up to 100 years. The Diagram on p. 51 illustrates Table I. by showing graphically the effects of different percentage rates. The vertical lines show divisions of years. The horizontal lines show divisions of values. The curved lines will be seen to cross the divisions of years at points of value corresponding with those in Table I., and the alteration in the curve indicates the decremental reduction in value as the capital becomes less.

Diagram on page 51 explained.

Examples of Table I.

Examples.—What will be the depreciated value in 12 years at the rate of 7½ per cent. per annum of a machine whose original value is £475 ? In Table I. the 7½ per cent. column gives 0·392,374 as the depreciated value of 1 after 12 years, and this multiplied by 475 gives 186·377 or £186 7*s.* 8*d.* Again, what will be the depreciated value in 70 years of a building whose original value of £1550 is written off at the rate of 1¼ per cent. per annum ? The 1¼ per cent. column gives 0·414,569 as the value after 70 years, and this multiplied by 1550 gives 642·58, or £642 11*s.* 6*d.*

These examples, while illustrating the effects of different rates of depreciation, do not show what generally takes place, for renewals and additions may go far to balance the depreciation, and in the case of an increasing business may more than neutralise it.

Example of depreciation in 30 years.

To illustrate this more clearly, an Example is given of the alterations in the value of a factory during a course of 30 years, where, owing to the nature of the trade, the buildings are depreciated at the rate of 1½ per cent. per annum, and the plant at 5 per cent. Credit is taken for renewals and additions, but not for current repairs. The altering values are shown graphically on the Frontispiece Diagram, and are as follows:—

Frontispiece Diagram explained.

The vertical lines in the diagram show divisions of years, the horizontal lines divisions of £100 and £1000 respectively. The factory is constructed at a cost of £21,000, exclusive of loose plant. Of this sum, legal and other preliminary expenses have cost £400, which is written off in four equal instalments, as shown by the diagonal black line at the left corner of the diagram. Land to the value of £1900 is purchased, but a portion of it being not at first required is let off to a tenant, and £700 is expended in adapting the remainder by levelling, draining, fencing and paving it, thus making a total under this head of £2600. As shown by the thick black line the value is not depreciated, but in the 14th year the portion let off is taken in, and £150 spent on its adaptation, raising the capital value in the books of account to £2750.

Preliminary expenses.

Land.

See page 25.

Buildings.

See page 28.

depreciated and added to.

The Buildings cost £10,000 and are depreciated at the rate of 1½ per cent. per annum, the diminishing value being indicated by the thick red line. If the renovations and additions be left out of the account, the depreciation would continue as shown by the dotted red line, which at the end of 30 years reaches a reduced value of £6354. But, as shown by the upper or rectangular red line, £320 is spent on additions in the 5th year, and as this sum more than balances the depreciation of that year, the mean, or real

Renewals of buildings.

Additions.

value, as shown by the thick red line, rises in that year; but the depreciation rate of 1½ per cent. being applied to this increased value, it again declines. During the 12th year an expenditure of £350 is made for structural renewals, and this is added to the capital account. During the 15th year, additional workshops are built at a cost of £1200, and again in the 25th year £600 is spent. At the end of 30 years the total expenditure on buildings, including the original outlay, but exclusive of current repairs, has been £12,470 and the capital value in the books of account stands at £8353.

Depreciation of plant.

Effect in 30 years.

Expenditure, how applied.

The Machinery and Plant, indicated in blue, show greater alterations. Only a sum of £8000 is spent at the commencement, space being left for additional plant. A rate of 5 per cent. is adopted, which if not neutralised by additions would depreciate the value as shown by the dotted curved blue line, bringing the whole plant down to a second-hand and scrap value of £1717 in 30 years. But as shown by the upper or rectangular blue line, additions are made from the beginning, and continued, with the exception of a few years, throughout the whole term, the money being applied in three ways, *i. e.* to the renewal of worn-out or obsolete plant by purchasing new, the price obtained on resale of the old going to diminish the expense; to the renewal of important parts of old plant, or the enlarging of machines so as to add to their earning capacity; and lastly, to the purchase of additional plant either to supersede manual operations, or to extend the output of the factory.

Depreciation neutralised

by expenditure.

Expenditure under any of these heads may be justly added to the capital value, and therefore goes to neutralise the depreciation, and produces as the actual mean value the thick blue line, which shows by its undulations the upward effect of the additions and the continually depressing effect of the depreciation rate of 5 per cent. Thus, in the 2nd year £250 is spent; in the 3rd year £520; in the 4th year £120; in the 6th year £70; in the

7th year £140; in the 8th year £450; in the 9th year £580; in the 10th year £680; in the 11th year £170; in the 12th year £50.

Trade has then become dull, and in the 13th year there is no expenditure on renewals. In the 14th year £200 is spent, and trade then reviving, and the business of the factory increasing, more land is taken in, and new workshops are built in the following year. In the 15th year £940 is spent on plant, and in the 16th year £1530.

Plant increased.

At the stock-taking at the end of the 16th year, after spending during 16 years £5700 in addition to the original outlay of £8000, the capital value in the books of account stands at £8084. Nothing is spent in the two next years. In the 19th year £150 is spent; in the 20th year £350; in the 21st year £400; in the 22nd year £400; in the 23rd year £500; in the 24th year £320; in the 25th year £600. In this year a new workshop is added, and in the 26th year £1060 is spent in plant; in the 27th year £510; in the 28th year £600; in the 29th year £450.

Result in 16 years.

Further additions.

At the end of the 30th year, the total expenditure from the commencement, including the original £8000, has been £19,040, while the value of the plant as depreciated appears in the books of account as £8073. There is the apparent anomaly that with a larger factory and an extended business the plant is worth no more than at first. The reduction is true as regards capital value, but the earning capacity is greater. That is to say, the factory and plant would be worth more to a tenant who paid rent, but who had not the burden of maintenance, while for the owner the plant would have a shorter life.

Result in 30 years.

Capital value reduced, but rental value increased.

Assuming that £8280, representing three-fourths of the expenditure during the 30 years, has been for the renewal of worn-out plant and the replacing of what has become obsolete, and that £2760, representing one-fourth, has been for extensions; then the new value of the plant left in

Analysis of expenditure.

working order at the end of 30 years would be £8000 + £2760 = £10,760, but taking the average remaining life of the plant—some of it being 30 years old, and some of it almost new—the amount of £8073 as appearing in the books of account would represent a present value.

Value with and without goodwill.

If the 5 per cent. rate has been a proper one, this remaining value should be correct, as between partners, exclusive of any goodwill; and if the business of the factory be continued, an incoming partner should pay either directly for goodwill, or in a more liberal valuation of the plant, for the advantage of acquiring not only a fully equipped factory, but the profitable employment attached to it.

See page 69.

Rate of writing off modified.

The foregoing example shows the effect of depreciation rates maintained without alteration for 30 years, but in practice modifications might be necessary. Thus, the experience of the first 12 years might show that owing to the durability of the machines and their careful management, 5 per cent. was unnecessarily high, and that a lower annual reduction might suffice. On the other hand, the rapid wearing away of certain parts of the plant, such as steam boilers, might have shown that the average rate was insufficient; or without such physical deterioration, a higher rate might be necessary to replace plant which had become obsolete.

See page 38

See page 16.

The deterioration of plant being as much an incident and expense of manufacture as the outlay for wages and material, though less direct and apparent, it is important thus to ascertain by occasional investigation what will be a safe but not excessive rate to allow for in calculating the cost of new operations.

Loose plant omitted.

Loose plant has not been included in the example just given. In a factory where depreciation rates of 1½ per cent. for buildings and 5 per cent. for fixed plant are necessary, the loose plant would probably be of a kind needing frequent renewals, which it is better to treat as a current expense, writing off nothing from the capital value. *See page* 40.

Table II. explained.

Table II. on pp. 54 and 55, shows the accumulation of a Reserved fund with compound interest in a term of years.

Example.

Example.—What will an annual reserve of £250 amount to in 18 years with compound interest at the rate of 3½ per cent. per annum. In the 3½ per cent. column 24·5 is given as the accumulated value of 1 in 18 years. This multiplied by 250 gives £6125.

Table III. explained.

Table III., on pp. 56 and 57, shows how much must be invested annually as a Sinking fund to accumulate with compound interest to £1 in a given term of years.

Example.

Example.—How much must be invested annually at 4½ per cent. compound interest to accumulate to £1250 in 22 years? In the 4½ per cent. column 0·0275 is set against the period of 22 years, and this multiplied by 1250 gives 34·375 or £34 7*s.* 6*d.* as the sum to be annually invested.

DIAGRAM ILLUSTRATING TABLE I. (pp. 52 and 53.)

The Effects of Depreciation at Different Rates for Terms of Years.

For Explanation, see page 45.

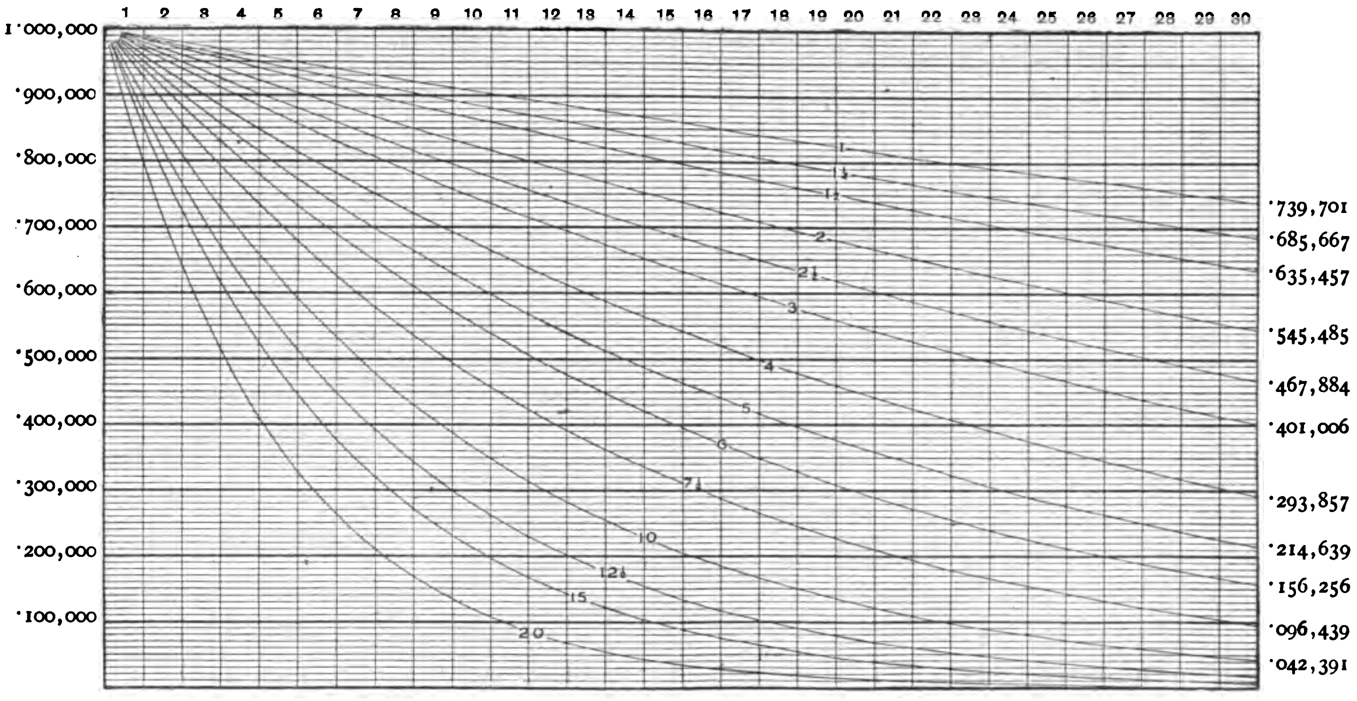

TABLE I.

The Effects of Depreciation at Different Rates for Terms of Years.

For Explanation, see p. 45.

Years.	1 per cent.	1¼ per cent.	1½ per cent.	2 per cent.	2½ per cent.	3 per cent.	4 per cent.
	1·000,000	1·000,000	1·000,000	1·000,000	1·000,000	1·000,000	1·000,000
1	0·990,000	0·987,500	0·985,000	0·980,000	0·975,000	0·970,000	0·960,000
2	·980,100	·975,156	·970,225	·960,400	·950,625	·940,900	·921,600
3	·970,299	·962,967	·955,671	·941,192	·926,859	·912,673	·884,736
4	·960,596	·950,930	·941,336	·922,368	·903,688	·885,292	·849,346
5	·950,990	·939,043	·927,216	·903,921	·881,099	·858,734	·815,372
6	·941,480	·927,305	·913,308	·885,843	·859,068	·832,972	·782,757
7	·932,066	·915,714	·899,608	·868,126	·837,591	·807,982	·751,447
8	·922,745	·904,267	·886,114	·850,763	·816,652	·783,743	·721,389
9	·913,517	·892,964	·872,822	·833,748	·796,235	·760,231	·692,534
10	·904,382	·881,802	·859,730	·817,073	·776,329	·737,424	·664,832
11	·895,338	·870,779	·846,834	·800,732	·756,921	·715,301	·638,239
12	·886,385	·859,895	·834,131	·784,717	·737,998	·693,842	·612,709
13	·877,522	·849,146	·821,619	·769,023	·719,548	·673,026	·588,201
14	·868,746	·838,532	·809,295	·753,643	·701,559	·652,836	·564,673
15	·860,059	·828,050	·797,155	·738,570	·684,020	·633,250	·542,086
16	·851,458	·817,699	·785,198	·723,798	·666,920	·614,253	·520,402
17	·842,943	·807,478	·773,420	·709,323	·650,247	·595,825	·499,586
18	·834,514	·797,385	·761,819	·695,136	·633,991	·577,950	·479,603
19	·826,169	·787,417	·750,391	·681,233	·618,141	·560,612	·460,419
20	·817,907	·777,574	·739,135	·667,609	·602,572	·543,794	·442,002
21	·809,728	·767,855	·728,048	·654,257	·587,620	·527,300	·424,322
22	·801,631	·758,257	·717,128	·641,171	·572,930	·511,655	·407,349
23	·793,615	·748,778	·706,371	·628,348	·558,606	·496,306	·391,055
24	·785,678	·739,419	·695,775	·615,781	·544,641	·481,416	·375,413
25	·777,822	·730,176	·685,338	·603,466	·531,025	·466,974	·360,396
26	·770,043	·721,049	·675,058	·591,396	·517,749	·452,965	·345,980
27	·762,343	·712,036	·664,932	·579,568	·504,806	·439,376	·332,141
28	·754,720	·703,135	·654,958	·567,977	·492,185	·426,194	·318,855
29	·747,172	·694,346	·645,134	·556,618	·479,881	·413,408	·306,101
30	·739,701	·685,667	·635,457	·545,485	·467,884	·401,006	·293,857
40	·668,972	·604,622	·546,321	·445,701	·363,232	·295,711	·195,366
50	·605,006	·533,157	·469,689	·364,171	·281,988	·218,065	·120,885
60	·547,157	·470,139	·403,805	·297,554	·218,915	·160,806	·086,352
70	·494,839	·414,569	·347,163	·243,124	·169,950	·118,582	·057,410
80	·447,524	·365,568	·298,467	·198,650	·131,937	·087,445	·038,168
90	·404,732	·322,358	·256,601	·162,311	·102,427	·064,484	·025,375
100	·366,033	·284,256	·220,607	·132,620	·079,517	·047,552	·016,870

TABLE I.—*continued.*

THE EFFECTS OF DEPRECIATION AT DIFFERENT RATES FOR TERMS OF YEARS.

For Explanation, see p. 45.

5 per cent.	6 per cent.	7½ per cent.	10 per cent.	12½ per cent.	15 per cent.	20 per cent.	Years.
1·000,000	1·000,000	1·000,000	1·000,000	1·000,000	1·000,000	1·000,000	
0·950,000	0·940,000	0·925,000	0·900,000	0·875,000	0·850,000	0·800,000	1
·902,500	·883,600	·855,625	·810,000	·765,625	·722,500	·640,000	2
·857,375	·830,584	·791,453	·729,000	·669,922	·614,125	·512,000	3
·814,506	·780,749	·732,094	·656,100	·586,182	·522,006	·409,600	4
·773,781	·733,904	·677,187	·590,490	·512,909	·443,705	·327,680	5
·735,092	·689,870	·626,398	·531,441	·448,796	·377,149	·262,144	6
·698,337	·648,478	·579,418	·478,297	·392,696	·320,577	·209,715	7
·663,420	·609,569	·535,962	·430,467	·343,609	·272,490	·167,772	8
·630,249	·572,995	·495,764	·387,420	·300,658	·231,617	·134,218	9
·598,737	·538,616	·458,582	·348,678	·263,076	·196,874	·107,372	10
·568,800	·506,299	·424,188	·313,811	·230,191	·167,343	·085,899	11
·540,360	·475,921	·392,374	·282,429	·201,418	·142,232	·068,720	12
·513,342	·447,366	·362,946	·254,186	·176,240	·120,905	·054,976	13
·487,675	·420,524	·335,725	·228,768	·154,210	·102,770	·043,981	14
·463,291	·395,292	·310,546	·205,891	·134,934	·087,354	·035,184	15
·440,127	·371,575	·287,255	·185,302	·118,067	·074,251	·028,148	16
·418,200	·349,281	·265,711	166,772	·103,309	·063,113	·022,518	17
·397,214	·328,324	·245,782	·150,095	·090,395	·053,646	·018,014	18
·377,354	·308,624	·227,349	·135,085	·079,096	·045,599	·014,412	19
·358,486	·290,107	·210,297	·121,577	·069,209	·038,760	·011,529	20
·340,562	·272,701	·194,525	·109,419	·060,558	·032,946	·009,223	21
·323,533	·256,338	·179,936	·098,477	·052,988	·028,004	·007,379	22
·307,357	·240,958	·166,441	·088,629	·046,365	·023,803	·005,903	23
·291,989	·226,501	·153,957	·079,766	·040,569	·020,233	·004,722	24
·277,390	·212,911	·142,411	·071,790	·035,498	·017,198	·003,778	25
·263,520	·200,136	·131,730	·064,611	·031,061	·014,618	·003,022	26
·250,344	·188,128	·121,850	·058,150	·027,178	·012,425	·002,418	27
·237,827	·176,840	·112,711	·052,335	·023,781	·010,562	·001,934	28
·225,935	·166,230	·104,258	·047,101	·020,808	·008,977	·001,547	29
·214,639	·156,256	·096,439	·042,391	·018,207	·007,631	·001,238	30
·128,512	·084,162	·044,225	·014,781	·004,790	·001,502	·000,133	40
·076,945	·045,331	·020,281	·005,154	·001,260	·000,296	·000,014	50
·046,070	·024,416	·009,300	·001,797	·000,332	·000,058	·000,002	60
·027,584	·013,151	·004,265	·000,627	·000,087	·000,011	..	70
·016,515	·007,083	·001,956	·000,218	·000,023	·000,002	..	80
·009,888	·003,815	·000,897	·000,076	·000,006	..	..	90
·005,921	·002,055	·000,411	·000,027	·000,002	..	..	100

TABLE II.

RESERVE FUND.—ACCUMULATION OF £1 PER ANNUM WITH COMPOUND INTEREST.

For Explanation, see p. 50.

Years.	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
1	1·000	1·000	1·000	1·000	1·000	1·000	1·000
2	2·025	2·030	2·035	2·040	2·045	2·050	2·060
3	3·076	3·091	3·106	3·122	3·137	3·153	3·184
4	4·153	4·184	4·215	4·246	4·278	4·310	4·375
5	5·256	5·309	5·362	5·416	5·471	5·526	5·637
6	6·388	6·468	6·550	6·633	6·717	6·802	6·975
7	7·547	7·662	7·779	7·898	8·019	8·142	8·394
8	8·736	8·892	9·052	9·214	9·380	9·549	9·897
9	9·955	10·159	10·368	10·583	10·802	11·027	11·491
10	11·203	11·464	11·731	12·006	12·288	12·578	13·181
11	12·483	12·808	13·142	13·486	13·841	14·207	14·972
12	13·796	14·192	14·602	15·026	15·464	15·917	16·870
13	15·140	15·618	16·113	16·627	17·160	17·713	18·882
14	16·519	17·086	17·677	18·292	18·932	19·599	21·015
15	17·932	18·599	19·296	20·024	20·784	21·579	23·276
16	19·380	20·157	20·971	21·825	22·719	23·657	25·673
17	20·865	21·762	22·705	23·698	24·742	25·840	28·213
18	22·386	23·414	24·500	25·645	26·855	28·132	30·906
19	23·946	25·117	26·357	27·671	29·064	30·539	33·760
20	25·545	26·870	28·280	29·778	31·371	33·066	36·786
21	27·183	28·676	30·269	31·969	33·783	35·719	39·993
22	28·863	30·537	32·329	34·248	36·303	38·505	43·392
23	30·584	32·453	34·460	36·618	38·937	41·430	46·996
24	32·349	34·426	36·667	39·083	41·689	44·502	50·816
25	34·158	36·459	38·950	41·646	44·565	47·727	54·865
26	36·012	38·553	41·313	44·312	47·571	51·113	59·156
27	37·912	40·710	43·759	47·084	50·711	54·669	63·706
28	39·860	42·931	46·291	49·968	53·993	58·403	68·528
29	41·856	45·219	48·911	52·966	57·423	62·323	73·640
30	43·903	47·575	51·623	56·085	61·007	66·439	79·058
31	46·000	50·003	54·429	59·328	64·752	70·761	84·802
32	48·150	52·503	57·335	62·701	68·666	75·299	90·890
33	50·354	55·078	60·341	66·210	72·756	80·064	97·343
34	52·613	57·730	63·453	69·858	77·030	85·067	104·184
35	54·928	60·462	66·674	73·652	81·497	90·320	111·435
36	57·301	63·276	70·008	77·598	86·164	95·836	119·121
37	59·734	66·174	73·458	81·702	91·041	101·628	127·268
38	62·227	69·159	77·029	85·970	96·138	107·710	135·904
39	64·783	72·234	80·725	90·409	101·464	114·095	145·058
40	67·403	75·401	84·550	95·026	107·030	120·800	154·762
41	70·088	78·663	88·510	99·827	112·847	127·840	165·048
42	72·840	82·023	92·607	104·820	118·925	135·232	175·951
43	75·661	85·484	96·849	110·012	125·276	142·993	187·508
44	78·552	89·048	101·238	115·413	131·914	151·143	199·758
45	81·556	92·720	105·782	121·029	138·850	159·700	212·744
46	84·554	96·501	110·484	126·871	146·098	168·685	226·508
47	87·668	100·297	115·351	132·945	153·673	178·119	241·099
48	90·860	104·408	120·388	139·263	161·588	188·025	256·565
49	94·131	108·541	125·602	145·834	169·859	198·427	272·958
50	97·484	112·797	130·998	152·667	178·503	209·348	290·336

TABLE II.—*continued.*

Reserve Fund.—Accumulation of £1 per Annum with Compound Interest.

For Explanation, see p. 50.

Years.	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
51	100·921	117·181	136·583	159·774	187·536	220·815	308·756
52	104·444	121·696	142·363	167·165	196·975	232·856	328·281
53	108·056	126·347	148·346	174·851	206·839	245·499	348·978
54	111·757	131·137	154·538	182·845	217·146	258·774	370·917
55	115·551	136·072	160·947	191·159	227·918	272·713	394·172
56	119·440	141·154	167·580	199·806	239·174	287·348	418·822
57	123·426	146·388	174·445	208·798	250·937	302·716	444·952
58	127·511	151·780	181·551	218·150	263·299	318·851	472·649
59	131·699	157·333	188·905	227·876	276·075	335·794	502·008
60	135·992	163·053	196·517	237·991	289·498	353·584	533·128
61	140·391	168·945	204·395	248·510	303·525	372·263	566·116
62	144·901	175·013	212·549	259·451	318·184	391·876	601·083
63	149·524	183·264	220·988	270·829	333·502	412·470	638·148
64	154·262	187·702	229·723	282·662	349·510	434·093	677·437
65	159·118	194·333	238·763	294·968	366·238	456·798	719·083
66	164·096	201·163	248·120	307·767	383·719	480·638	763·228
67	169·199	208·198	257·804	321·078	401·986	505·670	810·022
68	174·429	215·444	267·827	334·921	421·075	531·953	859·623
69	179·789	222·907	278·201	349·318	441·024	559·551	912·200
70	185·284	280·594	288·938	364·290	461·870	588·529	967·932
71	190·916	238·512	300·051	379·862	483·654	618·955	1027·008
72	196·689	246·637	311·556	396·057	506·418	650·903	1089·629
73	202·606	255·067	323·457	412·899	530·207	684·448	1156·006
74	208·672	263·719	335·778	430·415	555·066	719·670	1226·367
75	214·888	272·631	348·530	448·631	581·044	756·654	1300·949
76	221·261	281·810	361·729	467·577	608·191	795·486	1380·006
77	227·792	291·264	375·389	487·280	636·560	836·261	1463·806
78	234·487	301·002	389·528	507·771	666·205	879·074	1552·634
79	241·349	311·032	404·161	529·082	697·184	924·027	1646·792
80	248·383	321·363	419·307	551·245	729·558	971·229	1746·600
81	255·592	332·004	434·983	574·295	763·388	1020·790	1852·396
82	262·982	342·964	451·207	598·267	798·740	1072·830	1964·540
83	270·557	354·253	467·999	623·197	835·684	1127·471	2083·412
84	278·321	365·881	485·379	649·125	874·289	1184·845	2209·417
85	286·279	377·857	503·367	676·090	914·632	1245·087	2342·982
86	294·436	390·193	521·985	704·134	956·791	1308·341	2484·561
87	302·796	402·898	541·255	733·299	1000·846	1374·758	2634·634
88	311·366	415·985	561·199	763·631	1046·884	1444·496	2793·712
89	320·150	429·465	581·841	795·176	1094·994	1517·721	2962·335
90	329·154	443·349	603·205	827·983	1145·269	1594·607	3141·075
91	338·383	457·649	625·317	862·103	1197·806	1675·338	3330·540
92	347·843	472·379	648·203	897·587	1252·707	1760·105	3531·372
93	357·539	487·550	671·890	934·490	1310·079	1849·110	3744·254
94	367·477	503·177	696·407	972·870	1370·033	1942·565	3969·910
95	377·664	519·272	721·781	1012·785	1432·684	2040·694	4209·104
96	388·106	535·850	748·043	1054·296	1498·155	2143·728	4462·651
97	398·808	552·926	775·225	1097·468	1566·572	2251·915	4731·410
98	409·799	570·513	803·358	1142·367	1638·068	2365·510	5016·294
99	421·023	588·629	832·475	1189·061	1712·781	2484·786	5318·272
100	432·549	607·288	862·612	1237·624	1790·856	2610·025	5638·368

TABLE III.

Sinking Fund.—Annual Investment to Produce £1 in a term of Years.

For Explanation, see p. 50.

Years.	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
1	1·0000	1·0000	1·0000	1·0000	1·0000	1·0000	1·0000
2	0·4938	0·4926	0·4914	0·4902	0·4890	0·4878	0·4854
3	·3251	·3235	·3219	·3203	·3188	·3172	·3141
4	·2408	·2390	·2373	·2355	·2337	·2320	·2286
5	·1902	·1884	·1865	·1846	·1828	·1810	·1774
6	·1565	·1546	·1527	·1508	·1489	·1470	·1434
7	·1325	·1305	·1285	·1266	·1247	·1228	·1191
8	·1145	·1125	·1105	·1085	·1066	·1047	·1010
9	·1005	·0984	·0964	·0945	·0926	·0907	·0870
10	·0893	·0872	·0852	·0833	·0814	·0795	·0759
11	·0801	·0781	·0761	·0742	·0723	·0704	·0668
12	·0725	·0705	·0685	·0666	·0647	·0628	·0593
13	·0660	·0640	·0621	·0601	·0583	·0565	·0530
14	·0605	·0585	·0566	·0547	·0528	·0510	·0476
15	·0558	·0538	·0518	·0499	·0481	·0463	·0430
16	·0516	·0496	·0477	·0458	·0440	·0423	·0390
17	·0479	·0460	·0440	·0422	·0404	·0387	·0354
18	·0447	·0427	·0408	·0390	·0372	·0355	·0324
19	·0418	·0398	·0379	·0361	·0344	·0327	·0296
20	·0391	·0372	·0354	·0336	·0319	·0302	·0272
21	·0368	·0349	·0330	·0313	·0296	·0280	·0250
22	·0346	·0327	·0309	·0292	·0275	·0260	·0230
23	·0327	·0308	·0290	·0273	·0257	·0241	·0213
24	·0309	·0290	·0273	·0256	·0240	·0225	·0197
25	·0293	·0274	·0257	·0240	·0224	·0210	·0182
26	·0278	·0259	·0242	·0226	·0210	·0196	·0169
27	·0264	·0246	·0229	·0212	·0197	·0183	·0157
28	·0251	·0233	·0216	·0200	·0185	·0171	·0146
29	·0239	·0221	·0204	·0189	·0174	·0160	·0136
30	·0228	·0210	·0194	·0178	·0164	·0151	·0126
31	·0217	·0200	·0184	·0169	·0154	·0141	·0118
32	·0208	·0190	·0174	·0160	·0146	·0133	·0110
33	·0199	·0182	·0166	·0151	·0137	·0125	·0103
34	·0190	·0173	·0158	·0143	·0130	·0118	·0096
35	·0182	·0165	·0150	·0136	·0123	·0111	·0090
36	·0175	·0158	·0143	·0129	·0116	·0104	·0084
37	·0167	·0151	·0136	·0122	·0110	·0098	·0079
38	·0161	·0145	·0130	·0116	·0104	·0093	·0074
39	·0154	·0138	·0124	·0111	·0099	·0088	·0069
40	·0148	·0133	·0118	·0105	·0093	·0083	·0065
41	·0143	·0127	·0113	·0100	·0089	·0078	·0061
42	·0137	·0122	·0108	·0095	·0084	·0074	·0057
43	·0132	·0117	·0103	·0091	·0080	·0070	·0053
44	·0127	·0112	·0099	·0087	·0076	·0066	·0050
45	·0123	·0108	·0095	·0083	·0072	·0063	·0047
46	·0118	·0104	·0091	·0079	·0068	·0059	·0044
47	·0114	·0100	·0087	·0075	·0065	·0056	·0041
48	·0110	·0096	·0083	·0072	·0062	·0053	·0039
49	·0106	·0092	·0080	·0069	·0059	·0050	·0037
50	·0103	·0089	·0076	·0066	·0056	·0048	·0034

TABLE III.—*continued.*

SINKING FUND.—ANNUAL INVESTMENT TO PRODUCE £1 IN A TERM OF YEARS.

For Explanation, see p. 50.

Years.	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
51	0·0100	0·0085	0·0073	0·0063	0·0053	0·0045	0·0032
52	·0096	·0082	·0070	·0060	·0051	·0043	·0030
53	·0093	·0079	·0067	·0057	·0048	·0041	·0029
54	·0089	·0076	·0065	·0055	·0046	·0039	·0027
55	·0087	·0073	·0062	·0052	·0044	·0037	·0025
56	·0084	·0071	·0060	·0050	·0042	·0035	·0024
57	·0081	·0068	·0057	·0048	·0040	·0033	·0022
58	·0078	·0066	·0055	·0046	·0038	·0031	·0021
59	·0076	·0064	·0053	·0044	·0036	·0030	·0020
60	·0074	·0061	·0051	·0042	·0035	·0028	·0019
61	·0071	·0059	·0049	·0040	·0033	·0027	·0018
62	·0069	·0057	·0047	·0039	·0031	·0026	·0017
63	·0067	·0055	·0045	·0037	·0030	·0024	·0016
64	·0065	·0053	·0044	·0035	·0029	·0023	·0015
65	·0063	·0051	·0042	·0034	·0027	·0022	·0014
66	·0061	·0050	·0040	·0033	·0026	·0021	·0013
67	·0059	·0048	·0039	·0031	·0025	·0020	·0012
68	·0057	·0046	·0037	·0030	·0024	·0019	·0012
69	·0056	·0045	·0036	·0029	·0023	·0018	·0011
70	·0054	·0043	·0035	·0027	·0022	·0017	·0010
71	·0052	·0042	·0033	·0026	·0021	·0016	·0010
72	·0051	·0041	·0032	·0025	·0020	·0015	·0009
73	·0049	·0039	·0031	·0024	·0019	·0015	·0009
74	·0048	·0038	·0030	·0023	·0018	·0014	·0008
75	·0047	·0037	·0029	·0022	·0017	·0013	·0008
76	·0045	·0035	·0028	·0021	·0016	·0013	·0007
77	·0044	·0034	·0027	·0021	·0016	·0012	·0007
78	·0043	·0033	·0026	·0020	·0015	·0011	·0006
79	·0041	·0032	·0025	·0019	·0014	·0011	·0006
80	·0040	·0031	·0024	·0018	·0014	·0010	·0006
81	·0039	·0030	·0023	·0017	·0013	·0010	·0005
82	·0038	·0029	·0022	·0017	·0013	·0009	·0005
83	·0037	·0028	·0021	·0016	·0012	·0009	·0005
84	·0036	·0027	·0021	·0015	·0011	·0008	·0005
85	·0035	·0026	·0020	·0015	·0011	·0008	·0004
86	·0034	·0026	·0019	·0014	·0010	·0008	·0004
87	·0033	·0025	·0019	·0014	·0010	·0007	·0004
88	·0032	·0024	·0018	·0013	·0010	·0007	·0004
89	·0031	·0023	·0017	·0013	·0009	·0007	·0003
90	·0030	·0023	·0017	·0012	·0009	·0006	·0003
91	·0030	·0022	·0016	·0012	·0008	·0006	·0003
92	·0029	·0021	·0015	·0011	·0008	·0006	·0003
93	·0028	·0021	·0015	·0011	·0008	·0005	·0003
94	·0027	·0020	·0014	·0010	·0007	·0005	·0003
95	·0026	·0019	·0014	·0010	·0007	·0005	·0002
96	·0026	·0019	·0013	·0010	·0007	·0005	·0002
97	·0025	·0018	·0013	·0009	·0006	·0004	·0002
98	·0024	·0018	·0012	·0009	·0006	·0004	·0002
99	·0024	·0017	·0012	·0008	·0006	·0004	·0002
100	·0023	·0016	·0012	·0008	·0006	·0004	·0002

PART II.

VALUATION.

CHAPTER VI.

DIFFERENT KINDS OF VALUE DEFINED.

"VALUE" is a term which has different significations according to the circumstances in which it is used. Thus, there may be the value to a vendor of a property taken by Compulsory purchase; there is the value as between Partners of a factory in full operation, or of the same factory as a "Going concern" to a purchaser who will have the advantages of the established management and connection; there is the Rateable value; there is the value of the factory as a whole if it has Stopped working; the value of what has been destroyed by Fire may have to be appraised; there is again the value of the Land, Buildings, and Plant if dismantled and sold separately; and finally there is the value, generally the lowest of all, obtainable by a Forced sale. These various kinds of value are referred to in the succeeding chapters.

See page 66.

See page 66.

See page 89.

See page 76.

See page 83.

See page 79.

Price, how determined.

The value of anything is sometimes defined as that which it will fetch; and in the sale of a factory, the price at any particular time will, if there be freedom on both sides, depend not on the original cost or on any arbitrary standard of value—although of course the cost at which a similar factory could be built and equipped is an important consideration—but on the competition either of buyers or sellers, in other words on the supply and demand. The element of freedom is wanting in a compulsory purchase; there, the basis of price is the value to the seller, who is compensated for what he loses and not for what the buyer gains.

Compulsory purchase. *See page* 66.

Value depends on earning power,

The real basis of value, however, which generally guides a purchaser, is the estimated earning power or the net revenue, past, present, and prospective, so far as it can be ascertained. From this point of view there is often more scope for difference of opinion than would at first sight appear. The rate of profit in the past is a primary basis, but this is not conclusive. A purchaser may see his way to improved methods, to an extended trade, or to a better utilisation of the plant, and so to greater profits. On the other hand, past profits may have been largely due to special knowledge of the proprietors, and much may really have been owing to skilled management, which, if obtainable at all in the future, may involve the payment of considerable salaries taking precedence of profits.

and on past profits.

Expenses of management.

Gross income and cost of maintenance.

Again, the profits of the past may have been due to favourable circumstances which have altered; or the past income as shown by books of account may have been unduly swelled or diminished by a wrong estimate of depreciation. The net profits may have been kept low by a too liberal writing off for wear and tear; and a new proprietor may see his way to a higher revenue by diminishing this annual charge. On the other hand, if the value of plant be taken too high, the gross profits will in the future have not only to bear the cost of a proper and higher rate of depreciation, but may have to pay off, in extensive repairs and renewals, an accumulation of past neglect.

See page 4.

No fixed rules for rates of profit.

There is no fixed rule for the percentage of profit which will induce capitalists to embark in a manufacturing trade.

The regularity of the trade, the chances of occasional high profits, the accompanying risks of loss, the locality in which the business is carried on, and the indirect advantages or drawbacks attending it, are all circumstances which tempt or repel different persons according to circumstances. It may be said, generally, that the tendency of profits in England has been downwards, and just as the return on the more secure investments in Government funds or railway debentures is by the growth of accumulated capital ever becoming lower, so in a different range, the profits of manufacturers tend to diminish.

Profits tend to diminish like interest of money.

Price determined by briskness of trade.

The selling value of a factory depends greatly on the briskness of trade at the time of sale; and a seller may legitimately take the advantage of higher prices that are ruling, and of the consequent inclination of purchasers to invest in such property. When the profits have been high, attention is directed to the trade in question; capitalists are inclined to embark in it; there are more buyers, and competition is favourable to the seller. The reverse occurs during a time of depression, and then, if a sale must be effected, the buyer has his opportunity.

Readiness for use enhances value. *See page* 80.

If transferred at a time of high prices, the real value depends mainly on the readiness of the factory. If because of high prices, capitalists begin to build new works, it will often be found that by the time they are ready prices have fallen, probably because new factories have increased the productive power, or even because the mere prospect of new factories induces competitors to lower their demands. If, however, a factory or any other undertaking can be bought in full working order, it may be profitable to pay a high price for it, so as to reap the immediate advantage. In the lace trade, for instance, the whole cost of the machinery may be recovered in one or two prosperous years, and therefore at a time of great demands and inflated prices it is not the intrinsic value

High purchase-price repaid by profits.

of the machines which determines their price, but their immediate readiness for use.

So in the coal trade, when prices are exceptionally good the owner or purchaser of a colliery in full working order may reap such profits as will recoup him for a high capital outlay; but if the profits so gained tempt others to re-open a disused colliery which has been allowed to fall into disrepair, or which is flooded with water, probably by the time there is coal to sell, prices will be low.

High prices are only transient.

When the nominal or current prices for any product of manufacture are very high, it will generally be found that these high prices are being paid only in a small proportion of cases, because the demand has outrun the supply; and it is because most manufacturers are already occupied with contracts taken at old rates that famine prices can be secured by the fortunate few who are free to undertake new work. And directly the others get rid of old contracts and are ready to reap the high rates, their very readiness causes the high rates to vanish. On the other hand, it is in a time of deep depression that prudent purchasers will often find the best opportunity for buying or building a factory.

Factories cheaply bought in dull times.

Value of a factory, how determined.

The circumstances which determine the Value of a factory are numerous and varied, but they may be broadly divided into two classes, general and particular. The former are of a wide kind and relate to the amount of Capital required and the manner in which it is to be provided; also to the Locality of the factory, the Tenure under which it is held, and to any Advantages which the district or site possesses for the trade in question. The second class of circumstances are those pertaining immediately to the Factory itself, its Buildings and Plant.

Locality.

See page 105.

The modern tendency towards large factories, in which labour-saving processes are extensively adopted, increases the amount of Capital required for profitable working.

Capital outlay.

Bold expenditure may give control of trade.

A bold expenditure may give the command of trade to those who have incurred it, even if in dull times the large current outlay for expenses can only be met by securing orders at or below cost price. It is this necessity of maintaining a large output in order to pay current expense without regard to profit, that in a time of depressed trade forces prices down to a level ruinous to ordinary traders.

Costly plant may be a cause of failure.

Large factories burdensome when only half employed.

On the other hand, while advantages due to skill and forethought rather than to expenditure of money are unquestionable, costly appliances may prove a cause of loss rather than of gain in dull times. For instance, a factory may be constructed with an output capacity of one ton of product per week for each £100 invested, as compared with existing and smaller factories which have cost £120 per unit of output. Moreover, the labour in the new factory may be only £3 per ton of finished product as compared with £3 10*s*. in the older factories. But it is possible that this low cost can only be maintained when the factory is in full work, and that when it is only employed at one-half or one-third of its capacity, the proportions may be altered. The expensive labour-saving machinery must remain as a burden which cannot well be got rid of, while workmen may be discharged in the smaller factory. Factories so established may eventually repay those who can afford to wait, but without a large trade the burden of capital, especially if some of it be borrowed, is a frequent cause of failure.

See pages 18, 64, 76.

Ultimately the profit is reaped by those who take advantage of the failure to buy the factory for much less than it has cost; and instances occur of a second or even a third change of ownership before the capital can be brought down to a sum on which the earnings will allow a profit.

Working capital.

Not only the capital sunk in the factory itself, and in the purchase of goodwill, but the Working Capital which the business will require, is a question of great importance as determining the value of the undertaking to a new-comer. There is a wide range in the proportion which liquid capital bears to sunk capital in different trades. In some, the operations of manufacture are speedy, the profits are earned quickly, and the turnover of capital is correspondingly frequent. In such cases, if the cost of material form the chief part of the total outlay, a large business may sometimes be conducted with moderate capital, because the material need not be paid for till the finished product is sold. But Wages need ready money, and hence it is that when the cost of labour forms a considerable proportion of the whole, a large liquid capital is necessary, and profits must correspond. Thus, while a miller, or a maltster, or a sugar refiner may sell his products within a month of purchasing his wheat or barley or sugar, and at a price only slightly above the cost of the raw material, a maker of locomotives may have to pay for his iron, steel, and copper many months before he obtains repayment; and moreover during that period will have had to pay in weekly wages three times the value of these raw materials.

Quick turnover.

Wages outlay.

Liquid capital.

The proportion which Borrowed Money may safely bear to the capital of the proprietors is also a matter of great importance, and it obviously depends on ever-varying circumstances for which no rule is possible. The risk of failure from this cause may be minimised by using only those forms of borrowing which, though conceding a higher rate of interest or a preferential share of profit, do not involve any sudden demands for repayment, rather than by borrowing at a low rate, with the risk of repayment being demanded at a short notice.

Borrowed money.
See pages 18, 76.

Risks may be avoided.
See page 103.

The question of Locality is dealt with in a separate chapter, but it may be remarked here that in dealing with an existing business the situation of the factory may usually be regarded as no longer an open question, and any

Locality.
See page 105.

advantages or drawbacks which the factory may possess in this respect, though they may increase or diminish its value, cannot be altered. This is so in the great majority of cases; but when a business is valuable in other respects, when for instance, there is an established organisation, an experienced staff, as well as a reputation or connection among customers, it may prove remunerative to buy such a business, if only to remove it wholly or partially to a different locality. Such a change is of course encouraged if the existing factory, or the site, has a realisable value for other purposes ; and the feasibility of a change in case of need is of importance where a factory is held on a lease soon to terminate.

Factory may be removed.
See page 25.

CHAPTER VII.

THE VALUE OF A FACTORY AS A GOING CONCERN.

IN the purchase of a factory as "a Going concern," or in its valuation on this basis, circumstances have to be considered which do not always present themselves in the annual stock-taking. The Capital as it stands in the books of account, does not necessarily represent the Real Value, which, when measured by the past, present, or prospective Earning Capacity of the undertaking, may be greater or less than the nominal or assumed value. A purchaser is the more anxious to be assured on this point because there is the natural conjecture that if the undertaking were profitable the proprietor would not desire to sell it. An explanation why the factory is offered for sale is generally therefore the preliminary step in the transaction.

Value measured by earning capacity.

Reasons for selling required.

Compulsory purchase.

In regard to Compulsory Purchase, or to any occasion where the purchaser rather than the vendor desires the transfer, it is the value to the vendor which determines the price. For as in the case of purchase by a railway company or municipality who wish to occupy the site, much of what the vendor loses may have no value to the buyer, as for instance the connection or goodwill, which may be jeopardised or lessened by removal. There is the marked difference between compulsory purchases of this kind by public bodies and purchases by traders, that the seller is free to commence working elsewhere and retains all the goodwill he can in removing to new premises.

Seller retains goodwill.

See page 69.

Loss by removal.

It is seldom, except in a retail trade, that much of the goodwill is lost by a mere removal to another and adjacent situation ; but a factory owner is entitled to Compensation for the expense and trouble of Removal, for the Damage caused to plant and stock, for the cost of Adapting his plant to new premises, for the Storage of his machinery and stock till he has obtained a new site, and for the loss of Profit till he can recommence working. Not only the past and present rate of profit must be taken into account, but the likelihood of a prospective increase ; and the seller is entitled to the capitalised value of what he is losing, subject to a deduction for what he may be likely to earn under altered circumstances.

Compensation for damage.

Prospective profits.

The number of years' purchase at which the Annual Income is to be Capitalised varies with the risks and vicissitudes of the trade ; and though an agreement based on precedent can sometimes be arrived at, arbitration has generally to be resorted to. When all the circumstances have been taken into account and a total sum arrived at, the vendor is entitled to a further sum for the compulsory nature of the sale ; and by practice and precedent 10 per cent. on the total is the amount which judges or arbitrators allow, and which sellers always claim.

Capitalised value of income.

Compensation for compulsion.

Leaving aside, however, the special conditions as above described attending a compulsory sale, there have to be considered in valuing the undertaking as a whole, the general circumstances already alluded to, which may qualify very considerably the total of the detailed estimate. Thus the value of the Land may have altered ; the advantages of any Goodwill, Monopoly, or Privileges pertaining to the undertaking have to be considered, or Deductions may have to be made because of adverse changes in these respects.

Estimate of value qualified.
See page 13.

In regard to the Land it may be that the Site has grown in value for the particular trade, and that owing to some of the circumstances which determine the choice of locality

Value of site.
See pages 25, 90.

the factory may possess advantages over others engaged in the same business. Certain trades have special localities, and inferior buildings if well situated may be more saleable and valuable than those well-built and equipped but wrongly placed. Past profits may in fact have been mainly due to these advantages of locality rather than to any in the factory itself.

Local advantages.

Site valuable for other purposes. *See pages* 26, 90.

If, however, the Site has grown in value not because of its suitability for the trade in question, but because of its situation in a town or city and its fitness for other kinds of buildings or for other purposes, then this increment may be an actual disadvantage to the factory, if owing to a fresh valuation on this basis it is burdened with a higher rent or interest on capital in consequence. But a site covered with factory buildings can seldom be utilised for other and more profitable purposes without dismantling; and loss in this direction may go far to balance the natural advantages of the site. A purchaser who intends to continue the business will be mainly guided by the earning power of the factory, and will not pay much regard to a prospective and problematical increase in the value of the land.

Dismantling. *See pages* 25, 79.

Excessive price paid for site. *See page* 26.

As an opposite case, a high price may have originally been paid for the land because of anticipated advantages which have not been realised; and an investigation may prove that for the particular purpose of the factory the book value of the land is excessive and must be diminished. It may be that an undertaking efficient in all other respects has been so burdened by the excessive capital account from this cause, or from a high ground-rent, that it has not proved profitable, and a reduction in capital value or in rent may be the condition of future prosperity.

Heavy burden of ground rent.

Factory sold as a Going concern.

Goodwill. *See page* 24.

In the sale of a factory as a Going concern, if not only are there orders on the books, but also a list of customers who regularly buy at prices which afford profit to the manufacturer, in other words, if there be a "Goodwill," it is obvious that a certain live value is given to the undertaking, which it would not possess as a mere aggregation of buildings and plant. The special value from this cause must obviously vary. It may be that better prices are obtainable than in other and less known undertakings, or that in dull times the factory is likely to be fairly well employed when others are idle. And as, in calculating the net revenue obtainable from a business, it is the Average Profits which have to be considered, the probability of constant employment is of great importance. Advantages of this sort are not always directly represented in the books of account, nor in the capital accounts of the partners, but they have a value to new purchasers as assuring a regularity of income. As, however, the permanence of such favourable conditions depends upon many future and unknown contingencies, their capitalised value must be calculated moderately.

Goodwill valued by average profits.

Value of goodwill not shown in accounts.

Capitalised value.

The Value of Goodwill depends to a considerable extent on the amount of capital required to carry on the factory; for, however well a business may be established, yet if in order to obtain the promised advantages a large amount of capital is required, the addition which the goodwill may be expected to make to the average revenue will be depreciated, even if interest on capital be deducted before reckoning the annual revenue. The plan is often adopted in the sale of a manufacturing business, of stating no separate price for goodwill, but of valuing the plant liberally on the assumption that profitable employment in the future is assured; while sometimes a premium is paid in addition for entering on the business.

Value diminished if large working capital required.
See pages 63, 64.

Premium paid on valuation.

Goodwill, whether paid for directly or not, generally represents much past expenditure in the making of the business, and this, though it may have been prudently written off by the proprietors, as being represented by no material assets, may yet be legitimately charged to new-comers, who are to reap the advantages of it. But

Goodwill valuable though written off.
See page 24.

Advertising. where such goodwill has been maintained by advertising or other active means, the value of the goodwill must not be reckoned without taking due account also of the expenditure for maintaining it.

Value of patent rights. In regard to Monopolies arising from Patents, where a manufacturer is merely a licensee, his advantage depends upon the amount of competition by others, who also have licences; and sometimes such competition is as severe as if no patent existed. But when the manufacturer has a **Monopoly may outlive patent.** monopoly of a patent, his profits may be large, and indeed are limited only by the demand of the purchasers. Even when the patent monopoly is at an end, the manufacturer whose name is associated with the goods, and who by years of use has his plant and processes well adapted, can generally work more cheaply than his competitors and retain in this way a partial monopoly for many years. But in the case of a widely known and important invention, like that of Bessemer steel, the advantage ends with the term of the patent right, as outsiders are generally ready to use the invention immediately.

Trade-marks. A Trade-mark may give a more permanent monopoly to the maker than a patent right limited to a term of years, because while, after the term expires, the right of manufacture becomes common, the monopoly of the trade-mark **Value, how limited.** will remain. But obviously its value will continue only so long as the seller can induce the belief that his mark or guarantee is a more trustworthy certificate of quality than any appearance of similarity which may be given by **Value of trade-mark abroad.** others. Where the trade-mark is recognised in foreign countries, it often is valuable to the proprietors long after its value has lapsed in the country of manufacture.

Sometimes a Monopoly depends neither on a patent **Secret processes.** nor a trade-mark, but on Secret processes of manufacture, or on the skill and experience of a limited number of workmen. The permanency of such a monopoly will then of course depend on the retention of such workmen, or the transmitting of their knowledge to others.

Patentees who manufacture.

The profits arising from the manufacture, and the advantages which may be expected to remain to those who have acquired experience in it, even after a patent has expired, sometimes induce patentees who are not manufacturers to establish a factory for carrying out their invention. This, however, generally results in loss, for the functions of inventor and maker are quite distinct; the operations of making, buying, and selling require a special commercial experience; and moreover, the manufacture is generally carried on best by those who have other and kindred operations or branches of trade which utilise the same plant and organisation.

Causes of non-success.

Depreciated plant may have revived value to new-comer.

The value of plant, as shown in the capital account of a factory which has been successfully managed, should be less than the real value to a new-comer who is to continue the business. Depreciation as treated in the accounts should not only balance the mere wear and tear, but provide for contingencies, and although partners, as between themselves, may have prudently written off on this basis, yet if, when the property is transferred, these contingencies have not occurred, the future risks no longer concern the sellers, who may justly retain what has in effect been an insurance or reserve fund. For instance, the value of patterns and other accessories may have been written down to little or nothing, because of a possible cessation in their usefulness, but if these accessories are still in use, the value to a new-comer revives, and a new departure may be taken in the way of depreciation.

CHAPTER VIII.

THE RENTAL VALUE OF FACTORIES.

Rental value.

Interest on cost varies with risk. *See page* 60.

IN the valuation of a factory as a going concern, it is sometimes desirable to arrive at its Rental Value. Different classes of buildings are supposed to yield certain rates of interest according to the trouble and risk attending them, and whatever may have been their original cost, purchasers will only value them on this basis.

Occupying owners

allow for rent as interest on capital.

Dwelling-houses and shops are usually let to tenants, and the amount paid in rent is, to the occupier, a distinct charge, which can be kept separate from all other outgoings. But in the case of Factories, the buildings are more often the property of the occupier, who in his annual accounts may either set down a sum for rent, or, including together all his outlay for land, buildings, and plant, may charge "interest on capital" on the whole; all of the net earnings which remain, after a sum has been set apart for depreciation, being treated as profit. Where one partner is the owner of a factory, a sum is paid or set apart as rent; where the partners are equally the owners, "interest on capital" is the usual method.

Gross rent must allow for depreciation.

In the case of a factory where the occupancy is assured for a term of years, and the rent is a first charge on profits, the rate of interest, to be an appropriate rate, should, so far as it applies to the buildings, be equal (with the depreciation rate added) to the rental which a landlord who owned but did not occupy a factory would let it for. For assuming that in either case the occupier, whether tenant or proprietor, did the repairs and paid for insurance against fire, then if 1½ per cent. per annum were reserved for depreciation, this with 5 per cent. interest would be equal to a rent of 6½ per cent. on the value. *See page* 89.

Factories let to working tenants. *See page* 95.

In certain trades where small factories or workshops are let out to working tenants, a much higher rate of interest than 6½ per cent. on the cost is charged as rent; but this is generally because of special risks, such as of having the premises unlet in dull times, or of the occasional non-payment of rent or of expenses in collecting it. There may also be risk of changes in trade which might render the factory less suitable, and therefore less secure as an investment, than ordinary house property. These circumstances do not weigh with equal force in the case of an occupying owner, but when they are incidental to the property, allowance would be made for them in determining the net rental value just as in assessing for rating purposes. *See page* 90.

Power included in rent.

In some manufacturing towns, factories or blocks of workshops are let out on rent; sometimes power sufficient for one or more looms or other defined machinery is included in this rent; sometimes a constant power is specified, or that which can be transmitted by a shaft or belt or pulley of certain size, running at a certain speed. Sometimes, more often abroad than in England, power alone is sold at an annual rate, but in these cases the rental value of the building is increased because of the convenient contiguity of such power

Value of leases, how determined.

In valuing a factory, the value of the building may, if taken separately from the plant, be reckoned on the rental basis as above. If the property is freehold or on a long lease, an addition may have to be made for prospective increase in value. If the property is held on lease only, then its freehold value must be diminished by the sum sufficient, if invested as a sinking fund, to repay at the end of the term the purchase money. Or the freehold value

Sinking fund. *See page* 56.

may be diminished by the sum sufficient to buy a deferred annuity of the annual or net rental value, commencing at the end of the lease and continuing on in perpetuity. The cost of any obligations specified in the lease must also be provided for. But even with these allowances leaseholds do not fetch so high a price as freeholds. There are, however, various systems of actuarial calculation suitable according to the tenure and the other circumstances of the case.

Local advantages. *See page* 105.

The Locality of the factory in regard to material, transport, and other circumstances, the general arrangement of workshops or other buildings, and the facilities afforded for the bringing in of material, for lifting and moving during the operations of manufacture, for the proper sequence of these operations, and for the delivery of the finished product, are all of importance in determining a rental value. In regard also to the plant, economy in working depends to a considerable extent on the order and arrangement of the machines and the mode of applying power to them. Besides the workmen immediately employed in the operations of manufacture, there is always accessory labour required, and accessory and unremunerative consumption of power. The loss of heat from the boilers and steam-pipes, the waste of power from ill-arranged engines, and the consumption of force by transmission-shafting, wheels, and pulleys, must always take place to a certain extent; the loss is sometimes excessive and unnecessary; and while in the laying out of a factory it is of course the object to minimise such loss, so in valuing an existing factory it is necessary to take it into account.

Value depends on arrangement of plant.

Cost of labour increased by defective arrangements.

Delay and risk in building new factories.

But in considering the rental value of an existing factory, however much it may be evident that a new factory would allow of improved arrangements, the fact that buildings and plant are already established is in itself of considerable value. The trouble, delay, and expense which always attend the designing of new works have been incurred, the risk of error has been run, and the buildings and plant have at any rate been proved by work actually done. The trouble and expense of fixing machinery add considerably to its cost, and generally more than the visible result discloses.

CHAPTER IX.

THE VALUE OF A FACTORY THAT HAS STOPPED WORKING.

See page 66.

IN the valuation of a factory as a whole, but yet not as a going concern, the preliminary question arises, as alluded to in a preceding chapter: why, if the undertaking had been profitable or capable of producing profit has it been stopped. There may be answers to this, such as the death of the proprietor, a temporary falling off in trade, or want of skill or attention in the management. Investigation should be made into such circumstances, because mistakes in the past may be conveniently remedied at a time of change; while if the non-success arise from some radical cause, such as an unsuitable locality or a permanent alteration in the trade, it may prove to be best to dismantle the factory and sell the plant. An unsuitable locality may render a factory, efficient in all other respects, quite valueless, if from local causes it is disabled from competing with factories more favourably situated.

Unsuitable locality. *See page* 105.

Excessive capital a cause of non-success. *See page* 63.

A factory may often prove unsuccessful because of an excessive burden of capital. Where the factory and the capital necessary to work it, are the unencumbered property of the occupiers, it may be expedient to continue working for a time for little or no profit, or at any rate till the profits become less than would be obtained as interest on the price of the factory if sold; but where the occupiers are working with borrowed money, or have to pay a preferential rent or interest, they may be unable to continue;

Borrowed capital. *See pages* 18, 63, 64.

and it will probably then be necessary for some of the capital to be cancelled to allow a profit on the remainder.

Opportunity for rectifying past mistakes.

Assuming that a re-starting of the factory under new conditions appears justifiable, a stoppage may not have been altogether a disadvantage, for there is now an opportunity of resuming work clear of past mistakes and engagements. There may indeed be a loss of "goodwill," but this depends greatly on the nature of the trade and on how far that rests on old connections. The value of the foundations, attachments, and other accessories to plant and machinery already installed, of course remains good, and there is the advantage that repairs and re-arrangements can be made, which in a going concern would be difficult or impossible. But when machines have been stopped, an allowance may be necessary in the valuation to provide for risks or uncertainties attending a recommencement, while in a still going concern the machinery might be seen in operation. Most kinds of machinery are liable to deterioration by remaining idle; some kinds suffer more during such a period than by the operations of working.

Goodwill.

See page 69.

Allowance for risks in recommencing.

Factories retain substantial value in suitable locality.

If a factory has been engaged in a staple trade and in a suitable locality, it will almost certainly retain a substantial value, though a favourable opportunity may have to be awaited to obtain a purchaser. The sale of a factory sometimes discloses that it has a value to some persons for reasons not affecting ordinary purchasers who look only to direct profit. Thus, a purchaser may have land or produce in the neighbourhood which is enhanced in value by the working of the factory or which would suffer loss by its stoppage; or he may have some manufacturing business complementary to that in question which will work well in connection with it. A public sale sometimes for reasons such as these elicits an unexpected competition.

Special value to particular persons.

The stoppage of a factory may have caused such loss in its neighbourhood, that the owners of property or

Factory may afford indirect profits.

See page 111.

tradesmen who have spare capital to invest, may be willing to share in the risk of re-establishing the business even with the foreknowledge or probability of only a small return in interest, because they will benefit by the local expenditure in wages and the consequent effect on rents of houses, and other direct or indirect advantages.

Value of machines, how arrived at.

If the machines are appropriate for their purpose then their value will be arrived at by adding to their original cost the expenses of installation, and deducting an amount for depreciation proportioned to their age and wear, and a further amount for any actual repairs they may require. It sometimes happens that a machine or apparatus has been so strengthened, improved, or added to, that it is really worth more than when new.

Old plant valuable if undisturbed.

There is often, in or about a factory, plant which is so old or worn that it would not bear removal, but which is likely to last a considerable time if left undisturbed. Although the necessity for renewals when this time shall have expired may be obvious, it is often an advantage that the immediate capital outlay for the purchase of the factory is thus reduced and the purchase of new machines spread over a term of years.

Obsolete machines valueless for use.

See page 16.

Sometimes the machines may be too worn to do the best work in the factory, and yet be useful for second-class operations. But a distinction must be drawn between what is merely partially worn and what is obsolete. In trades where new labour-saving processes have been introduced, the free gift of certain machines, even though they be in good condition, would not prevent loss in using them if the labour attending their use much exceeded that in competing factories, or if they produced goods of an inferior quality. Such machines should be got rid of at whatever loss, and sold to those who could use them in kindred but less important operations.

Assuming that the factory in resuming work is to be employed in the same business as before, the value of the plant may be arrived at by the same process as in a going concern, but with this difference, that while in the latter a premium for goodwill may have to be paid, there may be, in the case of a factory that has stopped working, the need for some deduction to compensate for the time which may elapse before it is all employed.

Goodwill. *See page* 77.

Deduction for loss of time.

If a change is to be made in the kind of goods manufactured, the value of the plant to a purchaser will be diminished by the cost of any alterations needed to render it suitable. Of course, a seller may elect to refuse a price so diminished, and may prefer to wait for a purchaser who can use the factory for its proper purpose. But on the other hand, if any of the machines have become obsolete for their original employment it will generally be to the seller's advantage that there be a change in the kind of goods to be manufactured.

Allowance for alterations.

Obsolete machines.

See page 77.

A new-comer will be largely guided, in estimating the value of the plant, by the reputation of the factory for good work during its previous occupancy. So also, if the occupiers have had a character for skill and judgment, plant chosen and arranged by them will be deemed to have a value accordingly. On the other hand, if the stoppage of the factory is supposed to have been due to inefficient management, the plant may be liable to disparagement.

Value of plant enhanced by past reputation,

or diminished by contrary cause.

If a factory is Dismantled the plant almost necessarily loses by removal, the extent of the loss depending on the nature of the plant and its mode of attachment to the premises. In the first place, the capital sunk in foundations and attachments to the buildings is generally all lost; and from the value which the plant would then have for re-erection elsewhere must be deducted the cost of taking down, and the expenses and risks of removal. In the case

Dismantlement.

Foundations and accessories.

of a self-contained machine depending very little on special attachment, the removal may be easy and the loss slight; in the case of machines or apparatus composed partly of brickwork, such as boilers and furnaces, the loss is very great.

Loss by removal.

Special machines.

A further depreciation is likely to occur if the machines have been made of special form or size to suit local peculiarities of land or buildings. Such special form may involve not only cutting to waste to allow of re-use, as in the case of shafting, piping, and belting, but actual alterations to suit a new situation. Original simplicity of design minimises the loss from such causes.

Loss by alteration.

Machines in common use sell best. *See page* 16.

As a rule, that plant sells best which is in common use for many trades. Thus a portable engine or an ordinary drilling-machine or screw-cutting lathe will find generally more bidders than an air-compressor or a deep-well pump. There are, however, exceptions to this rule, there sometimes being a keen competition for special machines not easily procurable new, such occasions arising oftenest when the trade in question is brisk. Manufacturers who see their way to immediate profit by adding to their plant, may be eager to buy what is at once available, when a similar but new machine could not instantly be got ready. Thus it is often expedient to await a favourable opportunity for the disposal of old plant rather than to force an immediate sale.

Readiness of second-hand plant is sometimes valuable. *See page* 61.

Minimum and maximum value. *See page* 31.

The minimum value of any second-hand plant is that of the old material it contains, less the cost of removal and breaking up. The maximum value is that of a similar article new, immediately obtainable. In the range between these two extremes, the actual price depends on collateral circumstances. Thus there is the locality of the sale. If it is in a town or district where there are numerous persons engaged in the same or kindred trades, there are likely to be more bidders than under contrary conditions, for a large or important sale is necessary to tempt purchasers to a

Locality of sale.

distance. It may even be expedient to remove the plant to a more favourable locality, but this is generally expensive and is rarely adopted.

Removal of plant for sale.

Value to users and dealers.

The best prices are generally offered by those who intend themselves to use what they buy. Failing such purchasers, the sale depends on Dealers, who buy to sell again, and a new set of circumstances determines price, for a dealer requires an intermediate profit and has also to consider not merely the cost of removal, but that of storage, the loss of interest while waiting for a customer, the risk of deterioration by time, or of improvements being introduced which will render the plant he has purchased obsolete, and the ultimate contingency of having to realise only the scrap or old material value.

Name of original maker affects value.

In a sale to dealers, the name and reputation of the original maker of the goods have a special value. For, while the first purchaser sees the machine in place with evidence of its having been usefully at work, a chance purchaser from the store of the dealer will have to be guided to a greater extent by the name or brand or trade-mark of the maker. This circumstance should not be lost sight of by purchasers of new plant, who may with advantage choose what will retain the best value in case of re-sale. Contractors for public works who buy plant for use in one contract only, and who from its commencement look forward to a re-sale, in which indeed much of their profit or loss is involved, have generally this circumstance in view when they purchase locomotives, steam cranes, or other important plant.

Re-sale of contractor's plant.

Dealers can sometimes pay more than users.

On the other hand, dealers can sometimes afford to pay more than users. They may command a wider circle of purchasers than are present at the sale; they may know of customers seeking what is now offered, or they may see their way by a moderate expenditure to give a more than corresponding improvement to their purchase.

Sale without reserve.

A sale without reserve may involve heavy loss to the sellers, and it is generally endeavoured to avoid it by placing a reserve price on what is to be sold. The postponement of a sale is, however, rendered difficult when the articles are heavy or cumbrous, and when a peremptory removal is necessary. In cases of this sort, as also in that of improper collusion among bidders, much depends upon the ability and experience of the auctioneer.

CHAPTER X.

THE VALUATION OF LOSSES BY FIRE.

Indemnity the basis of insurance.

THE principle of Fire insurance, according to the practice of all English offices, is that of Indemnity, and not, as in the case of either marine or life insurance, the payment of a fixed sum agreed upon beforehand. For example, if a factory which has been insured for £1000 be wholly or partially destroyed by fire, the amount of the loss will have to be appraised, and only the actual amount of loss, with a maximum of £1000, will be paid. The assured have to produce as particular an account of their loss as the nature of the case permits, according to the terms of the policy; and in the case of a factory containing plant of fluctuating value, the making up of an equitable claim for loss by fire needs considerable care.

Loss must be appraised.

Difficult to estimate loss.

It is often difficult after a fire to make up an exact estimate of loss. If the books and papers are preserved, invoices and other vouchers will probably be available to show the cost of the plant, material, and stock as they entered the factory. If these vouchers have been lost in the fire, then outside evidence from those who supplied the plant and goods, will have to be collected as the basis of a claim.

Vouchers to prove loss.

Value defined and limited.

The value of the property immediately anterior to the fire is that on which the estimate of loss must be based, and as it is the current or market value of the articles consumed, and not the original price of them, any rise or fall of value takes effect, and the assured is paid accordingly.

Depreciation. *See page* 12. **Reinstatement.**

Thus the question of Depreciation necessarily arises, for an insurance office does not undertake to reinstate or to provide new buildings and plant in the place of old ones. An analogous case arises in marine insurance, where, if a ship be damaged, the underwriters in paying the cost of repairs deduct, unless the ship be new, one-third, on the ground that the substitution of new for old material is a benefit to the shipowner.

Accessories included in loss.

Subject to the total amount recovered not exceeding that on the policy, the assured is entitled to the value of plant equipped as at the time of the fire, and therefore all cost of foundations and attachments, as well as the cost of installation, have to be included. The assured is also entitled to the cost of removing the *débris.* On these bases, and allowing for possible deduction for depreciation, the sum paid should be sufficient for the reinstatement of the factory. In regard to deductions which may be claimed by the insurance office on account of the worn condition of the buildings or plant, the assured may be called upon to furnish information as to the length of time the factory and plant, or any part of them, have been in operation; and in this respect English offices generally deal liberally with the assured.

Deductions for wear and tear.

See page 12.

Those who have an old factory, and who have written off little or nothing for depreciation, may find that the sum recoverable leaves them deficient of the capital value recorded in their books of account. If any of the plant has become obsolete, such a fact will also be taken into account as reducing its original value; and patent rights which may have increased the original cost, but which have since lapsed, will not be allowed for.

On the other hand, if it can be shown that the plant which has been destroyed was, by reason of its kind or arrangement, of greater value than when first purchased, the assured will be entitled to a corresponding compensation. Where plant has been regularly depreciated, it does not follow that only the value as so lessened can be claimed. Depreciation is, after all, but an estimate of what may be necessary to meet contingencies, many of them of a speculative kind, and as the losses provided against may have been escaped, a review of all the circumstances, so far as they can be ascertained, may show a higher value than is stated in accounts drawn up for a different purpose. Surveyors or engineers accustomed to the class of property destroyed are generally employed to appraise the loss, and in case of dispute arbitration is resorted to, the right to such a mode of settlement being generally reserved by the insurance office in the policy.

Past depreciation revised.
See page 21.

Value may be more than shown in books of account.

Sometimes the valuation is assisted by the fulness of the description of the property which has been furnished to the insurance office at the time the policy was issued, but in the case of a factory with a constantly fluctuating amount of plant it is seldom that everything can be set down in advance, nor can the absence of such a detailed description bar the claim of the assured.

Valuation assisted by description supplied by assured.

There are, however, certain kinds of property which must be classed separately, and a maximum value set upon them at the time of insurance. Such, for instance, are drawings if they exceed a trifling amount, patterns, models, and moulds, which in the engineering and other trades may have a special value. Not only must a maximum total value be stated, but the insurance office will limit the sum payable on any one such article.

Drawings and models classed separately.

In the case of finished or partly finished goods in the hands of the manufacturer, the cost of production is the measure of damage, exclusive of profits and without any addition to the cost for interest on capital employed either in plant or machinery.

Goods in course of manufacture.

One important respect in which the conditions of fire insurance differ from those in marine insurance is in regard

Partial loss. to Partial loss. Thus, if in the case of a factory consisting of one building, constituting one "risk" worth £10,000, the owner chooses to insure it only for £8000, and if part of the factory be burnt to the extent of £8000, the insurer can, according to the general English practice, recover that sum, while in marine insurance if only 8–10ths of the total value had been covered, only 8–10ths of the partial loss would be paid.

Fire insurance differs from marine.

Colonial and foreign losses.

This rule of English fire offices extends also to property in the Colonies insured by them, but as in most Foreign countries the condition just described as usual in marine insurance prevails for fire risks also, English fire offices generally adopt it in the policies they issue in such countries.

Each building deemed a separate risk.

The English practice of "specific assurance," as it is called, does not, however, apply when several buildings are insured together in one sum. When the property lies in more places than one, so as to form a plurality of risks, it is required either that a distinct sum shall be insured upon the property contained in every separate building or place, or that the assurance shall be subject to the condition of average, or "average clause" as it is termed.*

Example of separate buildings.

For instance, if a factory consisting of two or more separate blocks of buildings be insured in one sum for £5000, and if one block be burnt, only the proportionate value which this one building bore to the whole is recoverable, even though its value may be £5000. Were it otherwise, two or more blocks of buildings might be insured for the premium of one, on the presumption that the risk was remote of more than one being burnt at the same time.

Fireproof divisions separate the risk.

In this respect rooms or workshops separated by fireproof doors in the manner prescribed by the Building Acts for structures of a certain size are deemed separate buildings and must be separately insured. There are also special rules in this respect for merchandise stored in public warehouses or on wharfs during transit.

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* See 'The Law of Fire Insurance,' by Charles John Bunyon, M.A., Barrister-at-Law. London: Charles and Edwin Layton.

Alterations in factory affect the insurance.

It is desirable for the foregoing reasons that any considerable addition to or redistribution of the plant in different workshops should be notified to the insurance office even if the value is still within the amount of the policy. If such alterations have in any way increased the risks of fire, either by circumstances inherent in the factory itself, or by contiguity to other buildings, then the neglect of such intimation may imperil the claim for compensation.

Conformity to conditions.

Although equitable treatment may be reckoned on by those who are themselves acting fairly, even if the information they have furnished does not fully come up to the conditions imposed by the insurance office, yet in many cases difficulties which might have been avoided arise from an insufficient conformity to such conditions.

Insurance offices reserve option of reinstatement.

Although, as has been said, Indemnity for what has been destroyed is alone recoverable, and Reinstatement cannot be claimed, the insurance offices always reserve the option of reinstating instead of making a money payment if they deem the estimate of loss to be excessive.

Consequential losses are not insurable.

Contract values or profits not insurable.

Consequential damage for losses by fire cannot be insured in English fire offices, though some of the underwriters at Lloyd's, who undertake fire risks arising in connection with marine risks, will occasionally insure such losses. Such, for instance, are the loss of time and profit which a fire may cause, and in the same category would be the contract value of, or the expected profit on, goods which are ready or in course of preparation for delivery. If the insurer can show that he was about to receive a certain sum for goods which have been damaged or consumed, such a fact, while it may assist in arriving at the true value, will not be accepted as the basis of a claim.

Losses appraised at current value.

The current wholesale value must be appraised, and it may be more or less than the contract price.

The leading principle of all fire insurance offices is to afford no opportunity for the insured to derive profit from a fire, and it is for this reason that profits on goods and consequential damages, which are difficult to appraise, are excluded.

Rent may be insured

But to the implied rule that only tangible losses are insurable, there is the exception of Rent, which as having a precise value that may be defined and that is not so liable as other indirect loss to be varied after the policy has been issued, is insurable. A landlord may insure the rent he would lose by reason of a fire; an occupier may insure the rent which, after a fire, may continue to be payable under the terms of a lease; and an occupier who owns his factory may insure the rent which he might have to pay for the use of another factory during the reinstatement of the one destroyed or damaged. But, a maximum of one year's rent is generally prescribed and, as in the case of direct loss by fire, whatever amount for rent may have been insured, the compensation is limited to the amount actually lost. Of course when it is desired to insure rent this must be specifically stated in the policy.

if stated in the policy.

CHAPTER XI.

THE RATEABLE VALUE OF FACTORIES.

Rateable value, how arrived at.

FACTORIES are rated for the Relief of the Poor on their Net annual Value. To arrive at this value, the gross Rent that a tenant would pay is ascertained or estimated, and a certain proportion of it is deducted for the cost of repairs, maintenance, fire insurance, and other charges which, taking an average of years, would have to be provided for before an annual net profit can be reckoned.

Deductions from gross value.

The proportion of the gross rent which should be so deducted must of course vary with the nature of the property and the burdens upon it. In the case of land, the net value may approach very nearly to the gross rental; in the case of buildings, if they are old and the cost of repairs and maintenance heavy, the deduction should be greater than with new and well-constructed buildings; but even in the latter case, eventual rebuilding must be held in view, and a depreciation rate or reserve allowed for which will maintain or replace the net income.

Assessment based on actual rent.

The principle of assessment on the net rental value is generally easy of application when, as in the case of a dwelling-house, the property is let to a yearly tenant, whose rent, confirmed by that paid for similar houses in the locality, forms a basis of calculation. The actual rent paid by a tenant is not, however, always conclusive, because it may happen that, owing to special circumstances, such rent is more or less than that which would be paid under ordinary conditions. Thus, there may be obligations on

Rent not always a fair basis.

the tenant in regard to repairs or reinstatement, which may make the rent more nearly approach the net annual value than is usual, or the tenant may be occupying under an old lease at a rent much below the current value. On the other hand, there may be certain privileges or indirect advantages in connection with the property which may induce a particular tenant to pay more than the property would fetch if let upon its own merits.

Difficulties in rating of factories.

Two main questions, sometimes involving considerable difficulty, have arisen in estimating the rateable value of Factories. One, where the factory, the fixtures and the plant belong to the Occupier and there is no separate sum charged for Rent, and where therefore the rental value has to be estimated; and the second, where it has to be determined which, if any, of the fixtures and plant are to be included in the "net rental" valuation.

See page 91.

Tenant's profits not rateable.

In regard to the first of these suppositions: where there is no tenant and therefore no actual rent paid, it is necessary to estimate what annual sum a tenant would be willing to pay for the use of the factory in question. The profits of the tenant earned by his own skill and capital are not rateable, and it must be considered merely what rent a tenant who bore the general risks of the business would pay. In estimating this, the cost of the factory and of similar factories, and the interest on the capital invested in them, are important aids to the calculation, but they are not conclusive. Owing to alterations in the trade in question, or in the method and cost of building factories engaged in such trades, or from local causes, the value of the factory may have fallen, and the rent which a tenant would be willing to pay may be less than the interest usual on building investments of a similar class. Or the reverse may be the case. Since the factory was built, its value may have risen, either through a general rise in the value of land in the locality, or from an increase in the cost of building such factories, or from local or trade causes

The cost of factories not a conclusive basis.

Growth of value.

which have increased the profits derivable from such factories, and have increased therefore the rent which an occupier would be willing to pay for the opportunity of earning such profit.

Factories not earning a direct profit.

The difficulty of arriving at a rental value where there is no tenant and no rent to be paid, is increased where the factory is carried on as part of a larger undertaking, and with no direct profit arising from it. Such is the case in Government or municipal workshops, or those attached to water or gas supply undertakings, where the value of the workshops is only a portion of the larger capital invested in street mains and other property; or in the case of railway workshops, where locomotives and wagons are repaired for use on the railway. The difficulty is sometimes solved by the rating authorities agreeing with the occupiers to accept as the rating value an agreed interest on the capital shown to have been invested in the workshops; but in the event of difference, the method referred to above has to be adopted of estimating what an imaginary tenant would pay, giving full consideration to the original cost and the rate of interest that would be remunerative as rental.

Railway workshops. *See page* 3.

Assessment based on capital value. *See page* 98.

Rateability of machinery and plant.

In regard to the second point previously referred to, of how far Machinery and Plant should be included in the Rateable value, considerable changes have from time to time taken place in the application of the rules laid down for the rateability of machinery. It has sometimes been sought to exclude trade fixtures from rateability. Although it is clear on the highest authority that chattels as such are not rateable, yet trade fixtures are in general clearly to be rated. In a well-known text-book,* on the subject it is stated,—

Trade fixtures. *See page* 99.

"That they are part of the freehold and would pass under a mortgage, and though in the case of a factory a tenant is allowed to

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* See 'A Practical Treatise on the Law of Rating,' by Edward James Castle, Barrister-at-Law. 1879. London: Stevens and Sons.

Fixtures removable by tenant.

remove them during his term, it is not in the same way as he might remove his furniture from a house, but only because the Courts were induced to relax the strictness of the old rules of law in order that the commercial interests of the country might be enhanced by the encouragement given to a tenant to employ his capital in making improvements for carrying on trade from the certainty of having the benefit of the expenditure secured to him at the end of his term."

Plant, as tenant's fixtures, not rateable.

It became usual in many parts of the country, apparently on the supposition that machines and plant removable as above by the tenant were not landlord's fixtures, to include in the rateable value only those fixtures which by the narrower view of the law, or by usage, clearly pertained to the freehold. Therefore, while boilers, furnaces, steam-engines and other apparatus which were deemed permanent were included, machines which were attached only by their own weight, or were only steadied by bolts, or which could easily be removed by a tenant without damage to the premises, were excluded from the rateable value. In fact, much the same separation into classes prevailed as is prescribed in the Bills of Sale Act, passed for an entirely different purpose.

Engines and boilers rateable.

Bills of Sale Act. *See page* 101.

But, although as a matter of usage this method of classification became established in certain districts and produced, in the case of particular trades, the same result as would a strict interpretation of the law, the principle of excluding machinery was not always upheld in cases where disputes came before the Courts. The diversity of practice arose mainly from the fact that the valuation is in the first instance in the hands of local overseers, or parochial assessment committees, who apply in different ways rules that had become established for other kinds of property. Such local valuations, however, take effect, and are followed as precedents in the district, unless appealed against in the superior courts of law. Appeals have sometimes been made by occupiers who

Machinery not always excluded.

Diversity of practice.

Appeals to the superior courts.

deem themselves too heavily rated, but as often by those who consider that their neighbours are insufficiently rated. It is in the decisions of the judges on these appeal cases, rather than in any statutes easy to be understood, that the law on the subject is to be found.

Law to be found in judges' decisions.

Some of the earlier cases were appeals from assessments where the plant omitted was of a kind generally included even when removable fixtures are excluded. Thus in the case* of the Phœnix Gas Company, in 1866, it was held that the retorts, purifiers, gas-holders, steam-engines, and boilers, were to be taken into account in assessing the rateable value, because they were fixtures which added permanently to the value of the premises; and that also the mains in the public streets were rateable, but that the meters which were the property of the company in the private houses of the consumers were not rateable because they were not indispensable to the manufacture of gas, for which purpose the works were established.

Case of the Phœnix Gas Co.'

It still appeared, and was so acted on in many parts of the country, as if machinery of a kind more easily removable should be excluded, and this was apparently confirmed in the case of the Halstead silk factory,† where it was held by the Court of Queen's Bench, on appeal in 1867, that while the value of the steam-engines, boilers, and shafting must be included in the assessment, the looms and other machines merely screwed to the floor were not to be included. In this case the machines were treated as the furnishing of a mill, which could be easily removed. The judge said, "These machines are common things in Lancashire. They are carried from one manufactory to another, and can be removed from one room to another. They are not so

Case of the Halstead silk mill.

Looms not rateable. *See page* 95.

Because not permanently fixed.

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* *Regina* v. *The Inhabitants of the Parish of Lee,* Law Reports, 1, Q. Bench Cases, 241.

† *Regina* v. *Overseers of Halstead.* The Justice of the Peace, February 22, 1868.

permanently fixed to the building as in the case of the gas-works."

This decision had the effect of confirming the system which prevailed in many districts in the assessment of all kinds of manufactories, but in the following year what appeared to be a stricter interpretation of the law again opened up the question of rateability. The Overseers of Bishopwearmouth, in a new assessment of the premises of Messrs. Laing, the shipbuilders, included in the valuation not only the steam-engines, steam-hammers, boilers and shafting, but also the lathes and machines for planing, drilling, punching and riveting; and against this assessment Messrs. Laing appealed to the Court of Queen's Bench, where the assessment on this wider basis was confirmed.* Chief Justice Cockburn, in his judgment, stated "It appears to us, after having carefully considered the character of the machinery in question, that the whole of it, though some of it may be capable of being removed without injury to itself or to the freehold, is essentially necessary to the shipbuilding business to which the appellants' premises are devoted, and must be taken to be intended to remain permanently attached to them so long as the premises are applied to their present purpose."

Case of Laing, shipbuilder.

Machine tools held to be rateable.

This case† attracted much attention, and as an authoritative declaration of the law was adopted in some other localities. But the decision is generally considered to have gone too far; if logically applied to factories in general, it might be held to include all machines; and the less rigid interpretation of the law which includes only undoubted

Laing's case not generally approved.

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* *Laing* v. *Overseers of Bishopwearmouth*, Law Reports, 3, Q. Bench Div., p. 299.

† Full particulars of this and previous cases are given in a book entitled 'Local Taxation and the Rating of Machinery,' by T. F. Hedley, of Sunderland (Knight and Co., Fleet Street, London), who supports the decision in the Laing case. The opposite view is maintained by James Pott, jun., of Sunderland, in a pamphlet 'Remarks on the Assessment of Machinery,' published by E. and F. N. Spon, London.

fixtures in the rateable value is that which is (1884) still generally applied.

In comparing the decision with that in the Halstead case the question arises as to where the line is to be drawn in including plant and machinery in the rateable value of a factory, because some of it may be as easily removable as is the furniture of a dwelling-house. An operative watchmaker would remove his lathe if the tenancy of his house and workshop expires; a Nottingham lace-maker removes his loom from the workshop where he rents floor-space and power; and the looms are, therefore, not rated.

As tending to make all tools rateable.

See page 73.

The question in regard to machines and machine-tools seems, therefore, to be this*—Would they be landlord's or tenant's fixtures in an occupation from year to year? Are they of such a perishable nature as not to outlast a yearly tenancy? Are they of a kind which so quickly wear out that a yearly tenant would find it worth while to attach them to the building; would structural alterations be required to allow the machinery to be attached to the premises? and other circumstances which would in an ordinary yearly tenancy determine whether the machinery should be supplied by the landlord or tenant.

The real question as to fixtures.

It is not necessary to consider whether a tenant would as a matter of fact remove his machinery and plant, but whether by usage, and as appropriate to the trade in question, he would have the right to remove them or sell them to a new tenant. There are many kinds of house fixtures, such as gas-fittings, and blinds, which, though the property of a tenant, are generally left behind and sold to the incoming tenant. Still, as tenant's fixtures they would be excluded from the rateable value, and the machine-tools of an engineer are generally regarded in this light, notwithstanding the decision in the Laing case. But according to

Machines removable by tenant.

Engineer's tools deemed to be removable.

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* E. J. Castle. See footnote, p. 91.

this decision, if a factory were so constructed as to be useful for no other purpose than that for which the machinery and plant had been fitted to it, such a circumstance would affect the decision as to the rateability of the plant.

It is to be noted that in the Laing case the judges did not investigate the facts, but merely decided on facts presented to them; and in the case it was stated that the machines were intended to be permanently used.

It will be seen that though certain principles of law have been declared by the judges, no actual enumeration of plant or machinery has been made. The principle having been agreed upon, the knowledge of engineers or others acquainted with the necessities and usage of particular trades is required to apply the rules to the factory whose rateability is in question.

Uniformity of rating system desirable.

It is desirable that the question should be set at rest either by a case more carefully drawn up and presented than the Laing case, and representative of the leading industries of the country, or, if necessary, by fresh legislation on the subject. So long as each local authority is allowed to settle the matter, as apparently they may do in the absence of an appeal, manufacturers in one district may be assessed much more heavily than those in another district with whom they compete; and even in the same town manufacturers of one class, such as engineers, to whom the Laing case more immediately applies, may contribute a larger share to the relief of the poor than do those of another class, such as those engaged in the textile trades, who are equally employers of labour.

Rateable value of machinery how arrived at.

Assuming that machinery is to be rated, the valuation should be made on the same principle as for buildings, but it is almost always necessary to allow a wider margin between gross and net value. The cost of repairs and renewals is generally greater than with buildings, for the deterioration is more rapid, and assuming a tenant who pays rent for the use of such plant, but who had not the burden of reinstatement, the landlord would have to apply a considerable proportion of the gross rental to such charges. Therefore, to take the case of an engineering factory or steel works, while one-sixth might be a sufficient allowance from the gross annual value of buildings, one-fourth or even more might have to be allowed from the machinery to arrive at the net rental value.

Gross and net rental value.

Broad rules for rating

In districts where there are many factories engaged in the same industry, the assessment is sometimes made according to certain broad rules, by which a minute investigation of every case is avoided. Thus, in some parts of Lancashire the annual rateable value of cotton-spinning factories will be reckoned at so much per spindle (even though the spindles themselves are not included in the value) on the assumption that the number of spindles determines with sufficient accuracy the size of the mill and its value to a tenant. Again, in the engineering trades the engines, boilers, and shafting, or whatever in the particular district is included in the rateable value, is assessed broadly at so much per horse-power. This, though a convenient method, may be applied too widely and sometimes presses unduly on the older factories. Thus in a modern cotton-mill, arranged after an improved method, the same number of looms or spindles as in an older mill may afford a greater or more valuable output, and the rental and rateable values are, therefore, greater than in an older mill; or, in an engineering factory there may have been a large capital outlay in improved steam-engines which consume a minimum of fuel. An engine of 100 horse-power which consumes only 2 lbs. of coal per horse-power per hour has obviously a higher rental value than one of similar power which consumes 4 lbs. per horse-power.

not always applicable.

Value of engines according to power.

An increase or decrease in the rental and rateable

Altered values. *See page* 48. **Deterioration.** *See page* 3. *See page* 48.

value owing to additions or deterioration has sometimes to be considered. In an old factory, if the buildings and plant have been fairly maintained, the annual value to a tenant may be undiminished even though the capital value to the proprietor may have decreased. But if the plant has become old-fashioned, or be no longer capable of producing so good or so much work as formerly, the rental value is obviously less.

Burden of rates equally allotted. **Railway companies unduly rated.**

On the one hand, it is due to the neighbouring proprietors of a district who are properly assessed, that owners of factories shall contribute their full share to the public burdens; and on the other hand, care is necessary to prevent overcharge to factory owners and especially to large corporations like railway companies, whose shareholders are widely spread and who do not always meet with the same consideration from the local authorities as do private owners.

Rating based on capital value. *See page* 91.

In the case of workshops belonging to railways and other corporations, where no direct profit is earned and where an agreed rate of interest on the capital outlay is accepted as a fair rateable value, the ordinary rules have to be observed in discriminating between a gross and net rental. Thus, if 5 per cent. on buildings be agreed upon as a fair rateable value, this would represent 6 or 7 per cent. as a gross rental from a tenant; and if much plant or machinery were included, although a rent to be remunerative might have to be 10 per cent., the net or rateable value might still be 5 per cent. If the land be taken separately, interest at 4 per cent. on the capital outlay is usual as an annual rateable value.

CHAPTER XII.

TRADE FIXTURES—BILLS OF SALE—DEBENTURES.

Landlord's and tenant's fixtures.

IN the preceding chapter, the question of Fixtures has been dealt with in regard to the rateable value of factories. Similar questions may arise between Landlord and Tenant, or between Freeholder and Occupier, or in the sale or transfer of a factory; for, although there are certain kinds of factory plant which are clearly the personal chattels of the tenant, and others which as clearly pertain to the freehold, there are often in or about a factory appliances or structures which cannot readily be placed in either category.

Fixtures attached to the land.

See page 92.

Steam boilers and engines.

Machines.

Fixtures attached to the land either directly or indirectly become part of the freehold, but as has already been shown it is generally held by a relaxation of the law in this respect, that many of the additions made for the purposes of trade may be removed by the tenant during his term. But the mode of attachment is an important element in the case, as well also as the exact purpose. Thus a boiler firmly built into brickwork, or a steam-engine on massive foundations, would be considered as permanent fixtures, while a machine placed without fastenings and held in position merely by its own weight, or one fastened by screws, allowing of removal without damage to the structure, do not generally become part of the freehold.

Disputes avoided by agreements beforehand.

Disputes may, however, be best avoided by making precise stipulations in the lease or other agreement. A tenant may anticipate the necessity or desirability of making additions, which, in the absence of an agreement to the contrary, might be claimed as landlord's fixtures, and he will, if possible, stipulate that he may remove them at the end of his term, if damage to the ground and buildings be avoided or made good, the option being sometimes left to the landlord to retain such fixtures on paying their value.

Where one partner owns the freehold.

Where one of several partners in a factory is the freeholder, the ultimate right to the fixtures and plant which have been bought or added at the expense of the firm should be clearly declared in the partnership deed or agreement of tenancy. Where the additions or improvements so relate to the land or buildings that they cannot easily be removed, compensation, and not removal, may alone be feasible; but for such additions the consent of the landlord is generally necessary.

Classification as in Bills of Sale Act.

See page 101.

The classification given in Clause 5 of the Bills of Sale Act, though made for a different purpose and not binding for any other, indicates very nearly the kind of distinction which prevails in the absence of agreement to the contrary, and this same classification follows very nearly on the lines which have been adopted in many districts as the basis of valuation for purposes of rating.

See page 92.

There is another aspect of this question of fixtures directly affecting the owners or occupiers of factories, which, though it has been much simplified by legislation, often gives cause for dispute, namely, the respective rights of Mortgagees and unsecured Creditors against the property in "trade machinery" of a Debtor.

Creditors and Mortgagees.

Until the year 1878, a judgment creditor, or the general creditors of an insolvent estate, often found, on attempting to realise the property of a debtor, that much of the plant and machinery which they had looked upon as available in case of need for payment of their debt had been already assigned. Thus, while by examining public registers or the lists issued by trade protection societies, traders are kept aware of assignments by Bills of Sale, it was

Factory plant assigned.

Uncertainty of the law.

repeatedly found from the uncertainty of the law in regard to fixtures, or by the ingenious application or perversion of the law, or from the various constructions put upon the law by different judges in the varying circumstances that arose, that machinery and plant could be secretly pledged or assigned to certain persons, to the exclusion of all other creditors. The opportunities thus afforded for fraudulent preference and for collusion between a debtor and favoured creditors, were greatly limited by the "Bills of Sale Act 1878," entitled—"An Act to consolidate and amend the law for preventing frauds upon creditors by secret Bills of Sale of personal chattels." By this Act, no assignment of trade machinery can be made except by a registered bill of sale, and regarding these, the Act declares in section 5:—

Fraudulent preference.

Bills of Sale Act of 1878.

"5. From and after the commencement of this Act trade machinery shall, for the purposes of this Act, be deemed to be personal chattels, and any mode of disposition of trade machinery by the owner thereof which would be a bill of sale as to any other personal chattels shall be deemed to be a bill of sale within the meaning of this Act.

"For the purposes of this Act—

'Trade machinery' means the machinery used in or attached to any factory or workshop;

Trade machinery defined.

1st. Exclusive of the fixed motive-powers, such as the water-wheels and steam-engines, and the steam-boilers, donkey engines, and other fixed appurtenances of the said motive-powers; and,

2nd. Exclusive of the fixed power machinery, such as the shafts, wheels, drums, and their fixed appurtenances, which transmit the action of the motive-powers to the other machinery, fixed and loose; and,

Motive powers and shafting excepted.

3rd. Exclusive of the pipes for steam, gas, and water in the factory or workshop.

The machinery or effects excluded by this section from the definition of trade machinery shall not be deemed to be personal chattels within the meaning of this Act.

Factory or workshop' means any premises on which any manual labour is exercised by way of trade, or for purposes of gain, in or

Factory or workshop defined.

incidental to the following purposes or any of them ; that is to say,

(*a.*) In or incidental to the making any article or part of an article ; or

(*b.*) In or incidental to the altering, repairing, ornamenting, finishing, of any article ; or

(*c.*) In or incidental to the adapting for sale any article."

Classification of trade fixtures

It will be seen from the above clauses that steam-engines, boilers, shafting and other fixtures are excluded, but it must not be assumed that they necessarily pass with the freehold. In the absence of a precise agreement between the parties, the kind, purpose, and mode of attachment would have to be considered; as also, in regard to a mortgage, would its terms and all the surrounding circumstances. On the other hand, while for the particular purposes of the Bills of Sale Act, and to prevent frauds upon creditors, trade machinery is deemed to be personal chattels, it does not follow that they are so for all intents and purposes, as has already been seen in the case of rateable value. Nor would the classification of the Bills of Sale Act necessarily apply between mortgagor and mortgagee where there were no other creditors. Factory plant is of such various kinds, and is connected to the ground in so many ways, that it is difficult to lay down any precise rules for general application.

limited in application.

See page 95.

Bills of Sale Amendment Act of 1882.

In 1882 was passed the "Bills of Sale (1878) Amendment Act," which does not affect the main principles of the original Act, but amongst other amendments adds in sections 4, 14, and 17, the following :—

"4. Every bill of sale shall have annexed thereto or written thereon a schedule containing an inventory of the personal chattels comprised in the bill of sale ; and such bill of sale, save as hereinafter mentioned, shall have effect only in respect of the personal chattels specifically described in the said schedule ; and shall be void, except as against the grantor, in respect of any personal chattels not so specifically described."

Schedule necessary.

"14. A bill of sale to which this Act applies shall be no protection in respect of personal chattels included in such bill of sale which but for such bill of sale would have been liable to distress under a warrant for the recovery of taxes and poor and other parochial rates."

Rent and taxes have precedence.

"17. Nothing in this Act shall apply to any debentures issued by any mortgage, loan, or other incorporated company, and secured upon the capital stock or goods, chattels, and effects of such company."

Debentures

It will be seen from these clauses that taxes and rates take precedence, as also does rent, of claims under a bill of sale.

There is the marked difference between Debentures and Bills of Sale, so far as general or outside creditors are concerned, that the debentures are not filed or registered in a public office where any one can inspect them, and are not therefore published in the weekly lists that are issued by private trade protection societies. But, under the Companies' Act of 1862, debentures, to be valid, must be registered in the books of the company that issues them; the omission of such registration renders the directors personally liable; and all persons concerned can claim to examine the register on payment of a fee of one shilling. Although debenture assignments are not registered in a public office like bills of sale, a list of shareholders, with the amount of share capital paid up and uncalled has to be filed every year at the Registry Office in London, and can be inspected by any one on payment of a fee of one shilling.

must be registered.

In the case of debentures issued by any incorporated manufacturing company, the extent to which the security mortgaged includes machinery and plant has to be carefully considered by all concerned. A debenture is supposed generally to be a form of mortgage, but the word is applied to securities of very different kinds. Debentures are in England issuable by most companies, whether "limited" or not, and in many the powers in this respect are defined and restricted by general or special Acts of Parliament.

Debentures vary.

Restricted by Acts of Parliament.

Some debentures only preference shares.

Some debentures are really only Preference Shares, and in regard to the capital or assets of the company which issues the debentures, though the holders might take precedence of ordinary shareholders in any winding up or realisation of the assets, they would rank only with other and unsecured creditors.

Debentures limited in amount.

In most railways, and the rule is generally adopted by other well-constituted joint-stock companies, the amount of the debentures is limited to a certain proportion, generally one-third of the paid-up share capital, the object being to give the debenture holders an assurance of the value of their security. Where a moderate proportion of this sort is ignored, and sometimes even when it is observed, the money raised by debentures may have formed the only beneficial expenditure and afford the only assets.

Trade fixtures mortgaged.

All assets included.

Some debentures mortgage the property of a company in a way which affects greatly the security of the general creditors, and this in regard to the trade fixtures. Such debentures are often very sweeping in their application, all the material assets of the company being assigned to trustees for the benefit of the debenture holder, the goodwill and in some cases even the uncalled part of the share capital being included in the assignment. Such debentures may hamper greatly the management of a manufacturing company, for the directors may be restrained from selling, exchanging, removing, or otherwise dealing advantageously with the plant of the factory. Care and skill are necessary in the framing of a debenture to give the maximum security to the debenture holders, with the minimum of restriction on the management.

Debentures must be registered and inventory added.

The Companies' Act of 1862 prescribes that in the register of debentures must be given a description of what is included in the mortgage, this description, so far as the protection of general creditors is concerned, being the equivalent of a schedule attached to a bill of sale.

CHAPTER XIII.

THE LOCALITY OF FACTORIES.

IN a previous chapter reference was made to the circumstances of Locality, which, apart from any general estimate of buildings and plant, go to determine the value of a factory for a particular trade. These circumstances should have been considered in the first establishment of the undertaking, but they are obviously an important factor in estimating value at a change of ownership. What was but conjecture or calculation before the factory was built, will now have been tested by actual experience.

See pages 62, 67, 74.

Locality of a factory affects its value.

It is as impossible as it would be presumptuous to set up rules for guidance in the infinite number of circumstances and combinations that present themselves, or to say which are the conditions in regard to locality and site which must determine value; and it is only attempted to enumerate some of the leading points that should be considered. It is always dangerous to follow precedent unless the circumstances are exactly similar; and what may have proved of the first importance in one branch of trade, or at a particular period, may be of secondary or no importance in another case. It is impossible to combine all advantages in any one factory; care should be exercised therefore in observing due proportion in estimating their value.

Conditions of value vary for different trades.

The choice of locality depends mainly on the contiguity to Material, on the cost of Transport, on the abundance of Labour, and on contiguity to the Consumer. Taxation and other public burdens have also to be considered; for these vary in different localities, and in some

Chief incidents of locality.

Taxation.

cases it is cheaper to establish a factory outside a certain district or town.

Contiguity to materials.

The importance of contiguity to suitable materials depends on their weight or bulk, on the cost of carriage, and the proportion which this bears to the whole cost of production. In trades where the cost of material bears a small proportion to the total expenses of production, distance may matter little; for instance, a maker of cutlery and firearms is not—other circumstances being favourable—weighted much even if the iron and steel are brought from a considerable distance.

Cost of carriage sometimes unimportant.

A locality near the material might be chosen where the latter was much heavier than the finished products, while if the products were also heavy, contiguity to the consumer or to a port of shipment might determine the choice. The effect which transport and storage may have on the quality of the material or finished goods has also to be considered.

Expenses of carriage.

The cost of Carriage to the port often amounts to as much as, or more than, the freight by sea to a distant country; and this circumstance, of course, is of increased importance for those commodities in which the expense of carriage bears a considerable proportion to their total selling price. In England the favourable situation of the coal and iron mines near to the sea allows manufactories to be established with both the above advantages, but nearness to a port is not always best for an inland trade.

Ports where materials arrive.

Factories are often established in the neighbourhood of ports at which the materials of manufacture arrive, or the factories having been established, the materials come there; thus, for example, there are seed-crushing mills at Hull, jute factories at Dundee, and cotton mills in Lancashire. But whether the factories follow the cargo, or the cargo the factories, Cheap freights inward depend upon the vessels obtaining return cargo, and when this is wanting the materials are burdened with higher freights. There are many instances of trade having left a particular district for reasons of this kind; and the risk is increased where the commerce of a port depends upon customs' tariffs liable to alteration.

Customs' tariffs.

Contiguity to a port.

While, however, the contiguity to a port may be advantageous where the goods are heavy, and may more than compensate for drawbacks which the locality may have in other respects, the choice and value of any particular port depend on various considerations. Where the goods are shipped in large quantities, as is often the case with coals, iron, or railway material, a vessel may be sent to the nearest port to fetch the cargo instead of the cargo being sent to a port which suits the vessel. But even where the goods offered are not sufficient to fill a vessel, they may be enough to induce a shipowner to send his vessel to call at a particular port to fetch them, to complete a cargo commenced or finished elsewhere.

Suitability of a port, how determined.

A port or harbour must be suitable for the particular trade and for the vessels which go to the foreign countries whose commerce is desired. Thus there must be sufficient draught of water, safe navigation, railway communications, facilities for wharfage and handling of goods, and moderate dues. In regard to the export of manufactured goods there must be inducements for vessels to enter. Such inducement may be in the abundance and variety of goods to be exported, but if it be a brisk import trade which brings vessels to the port, it may be an advantage to a manufactory that its products are alone available for outward cargo; as, in the absence of competing cargo, low rates of freight outward may be obtained.

Ballast cargo.

Some trades indeed depend entirely on cheap rates of freight, only rendered possible by the necessities of the shipowner. Thus, cement, old iron, and other rough goods are carried from London to New York at rates of from 4*s.* to 8*s.* per ton, because ballast cargo is wanted and the

American tariff limits the shipment of general merchandise. So also iron ore is shipped at Lisbon at 3*s.* per ton, and brimstone from Sicily at 10*s.* per ton to the United States. The real cost of freight is in these cases partly paid by the shippers of light goods westward, but mainly by the shipper of produce from America, who must pay enough to remunerate the shipowner for the double voyage. On the other hand, if there is not much inward trade, then an abundance of outward cargo may be necessary to attract vessels. Therefore, although vessels to any foreign country may sail indifferently from any British port, it has become the custom, either because of the exigencies of the homeward trade, or because certain harbours are suitable for the vessels in question, or for other economical reasons, that particular trades or destinations are associated with particular ports of departure, and factories connected with these trades are established in the vicinity.

Customary ports.

Trade localised.

Perhaps there is no better instance anywhere of the localisation of a trade than that of the manufacture of Portland cement in the neighbourhood of London, on the rivers Thames and Medway. The chalk and clay from which the cement is made are found close together, on or near the river bank, and yet quite separate, so that the proper proportions can be exactly measured; the coke from the large gasworks of London, also on the river-side, affords a cheap and plentiful supply of suitable fuel; and the situation of the factories allows the cement to be loaded into barges, coasting vessels, and export ships at a trifling expense. Moreover, as vessels leave London for almost all foreign ports, the cement as weight or ballast cargo has the advantage of very low freights.

Example of Portland cement.

Inland water-carriage.

Inland Water-carriage affords many advantages, as goods once embarked may be carried long distances at a much less cost than by road or railway; and in case of bulky, heavy, or fragile goods the risks of carriage are generally less. For, however much competition or other causes may reduce rates of railway freight, the bare cost of haulage must at least be paid. Canals and navigable rivers can always compete with railways in the cheapness of carriage, except when a very prompt delivery is of great importance. The advantages of canal carriage are, however, often neutralised by artificial restrictions, as for instance, when they are controlled by the railway companies.

Canal carriage.

Cartage is a serious item of expense in some trades, and may be onerous enough, if competition arises with other factories more favourably situated in this regard, to stop the business, or to absorb nearly all of what without the cartage would be a remunerative profit. Thus, an iron foundry at the top of a hill, or at a distance from a railway station, is heavily burdened in regard to the cartage of pig-iron, coal, sand, and castings. Even a small distance may render necessary the keeping of horses and carters, as well as an expense of loading and unloading, which would be avoided if the factory were situated on a railway siding or canal. Sometimes the expense lies not in constant cartage but in the occasional moving of very heavy goods, as where a boiler-maker, or marine engineer, or locomotive-builder may have to hire special teams of horses to drag heavy loads to a wharf or railway station. Cases of this sort are rapidly diminishing in England, either by the closing of unprofitable factories or by the opening of new railways.

Cartage expensive for heavy goods.

Horses. *See page* 43.

But while cartage may be saved by building a factory immediately on the railway, canal, river, or harbour which serves for transport, the convenience offered should not be over-estimated and allowed too great a weight against the opposing advantages of another site. The proportion which the expense of cartage bears to the total cost of production and delivery, differs of course with the nature of the trade. A manufacturer of light and valuable goods, if there be the general advantages of railway or canal

Cartage costs little for light goods.

carriage into the town or district, might find no sufficient inducement in the saving of cartage to draw him from an otherwise desirable site to one adjoining a railway.

Railway sidings.

A Railway Siding at a factory often enables a manufacturer to load and pack his goods more carefully or systematically than would be feasible at a common railway station, and in the case of heavy goods to utilise special cranes of the factory which do not exist at the station. Railway companies, however, do not always allow a reduction of charges corresponding to the duties of which they may be so relieved.

Utilisation of waste products

The utilisation of Waste Products, which are necessarily localised, often determines the position of a factory; or the profits of the factory itself may depend upon the sale of its own bye-products. Thus, in large cities, factories find profitable employment in dealing with various kinds of refuse, while similar factories in less populous places would be quite unremunerative. Illuminating Gas can be made cheaply when the coke, pitch, oil, and ammonia find a ready sale; and as these sell best in considerable quantities, large cities have an advantage in the lower price of gas, of which London is an example.

as in Gas making.

Contiguity to consumer.

Contiguity to the Consumer is the circumstance that determines the locality of most factories, especially those of moderate extent. There are certain trades that are always necessary, and unless there be special difficulties in obtaining material or workmen, factories become established as the population reaches a certain point. This contiguity to the consumer, is in such cases of greater importance than contiguous material, for the convenience to the purchaser of ready conference with the manufacturer, of examination of the goods, and of speedy delivery, may outweigh the mere saving in money which purchasing from the more distant factory might allow. The more successful or enterprising of such local manufacturers gradually acquire a trade with distant towns or with foreign countries; and, as the local customers thus become of less importance, the question of removal to a locality more favourable for a wholesale or export trade arises. Sometimes manufacturers combine both methods by retaining their offices and a small factory in the town where they are known, and establishing their principal factory in a more suitable place.

Skilled workmen.

Skilled Workmen may generally be best obtained in localities where there is a congregation of similar or kindred trades, as numerous factories create a good labour market and induce workmen to seek employment there. Such a congregation of factories also brings purchasers to the locality.

Cheap labour remote from towns.

It is expedient sometimes, in the case of certain trades, to choose a locality remote from a town, because labour may be obtained cheaply there, or because the workmen are less influenced by trades unions; but skilled workmen not unfrequently dislike factories remote from large towns, and prefer places where comforts and amusements are more abundant. A site otherwise desirable may be rendered useless for lack of Workmen's Houses, and if these have to be built for the purposes of the factory the capital expenditure becomes greatly increased. An expenditure for workmen's houses often proves a profitable investment for capital; but if the houses depend entirely on the new industry for tenants, a heavy pledge for its continuance is added to the general risks.

Workmen's houses.
See page 78.

Subsidiary trades.

Contiguity to Subsidiary Trades is sometimes of more consequence than at first appears. Thus, if a Birmingham gun factory, a Sheffield cutlery works, or a Nottingham lace mill could be transported with all its workmen to a district where materials were plentiful and a demand brisk for the commodities, but where no other similar factory existed, it might fail for want of the preliminary trades which perform cheaply, because exclusively, the earlier processes with the raw material, or certain finishing processes usually performed separately; for want of the adjunct or contributory trades for repairs and renewals, and for want of the various minor purveyors who surround the numerous similar factories in the original district, but which a single factory could not alone support. In other words, this subdivision of labour requires a large trade and a busy population; thus industries needing such contributory trades are difficult to transplant.

Contiguity to fuel or power.

Contiguity to Fuel or to Power may be absolutely necessary to allow of competition with rivals similarly favoured, but fuel is so cheap in England that except in metallurgical or chemical manufactures the cost does not greatly affect the choice of locality.

Water supply.

Water is necessary to most trades, quantity being important in some cases, as for washing ores or refrigerating; quality in others, as for paper-making and brewing; while the pressure from elevated reservoirs or from rapid streams is valuable as power. The Water Power of rivers or waterfalls is in some cases used with advantage instead of fuel power, and where a cheap or gratuitous source is available such an alternative is worth consideration. But where coal is cheap as in England, it is only in rare cases that the advantages of water power balance the drawbacks to its use. Thus the locality may be inconvenient; and if, in order to utilise water power, a factory has to be built in a place badly situated for materials, transport, subsidiary trades, workmen's houses or customers, such power, even if costing nothing in money, may be dearly bought. In order to render water power available, considerable expense in dams, reservoirs, conduits and sluices may be necessary; and the expense of these may quite outweigh the capitalised equivalent of fuel consumed in a steam-engine. It is for these reasons rather than from inherent difficulties that the question of utilising tidal forces is post-

Water power.

Value restricted by cheaper fuel power.

Expenses of water power.

Tidal forces.

poned. Water power is liable to stoppage in dry seasons; and if a supplementary steam-engine has to be provided, much of the advantage of the water is lost. Water power is also liable to diminution by operations of drainage, or an increased consumption higher up the stream, involving possible disputes.

Transmission of power by water.

The above remarks do not touch on the question of the transmission by the accumulator or other water system, of power produced by a steam-engine or other original motor at a distance, such transmission being often convenient in or about a factory. And if new forms of storing and transmitting force cheaply by electricity or other means are invented, natural sources of water power will at once have an enhanced value, as they could then be utilised by factories placed in a convenient locality.

THE END.

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